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The Larger North American Mammals

E. W. NELSON–LOUIS AGASSIZ FUERTES

An Intimate Study of the Larger Wild Animals of North America
by the Foremost Authorities

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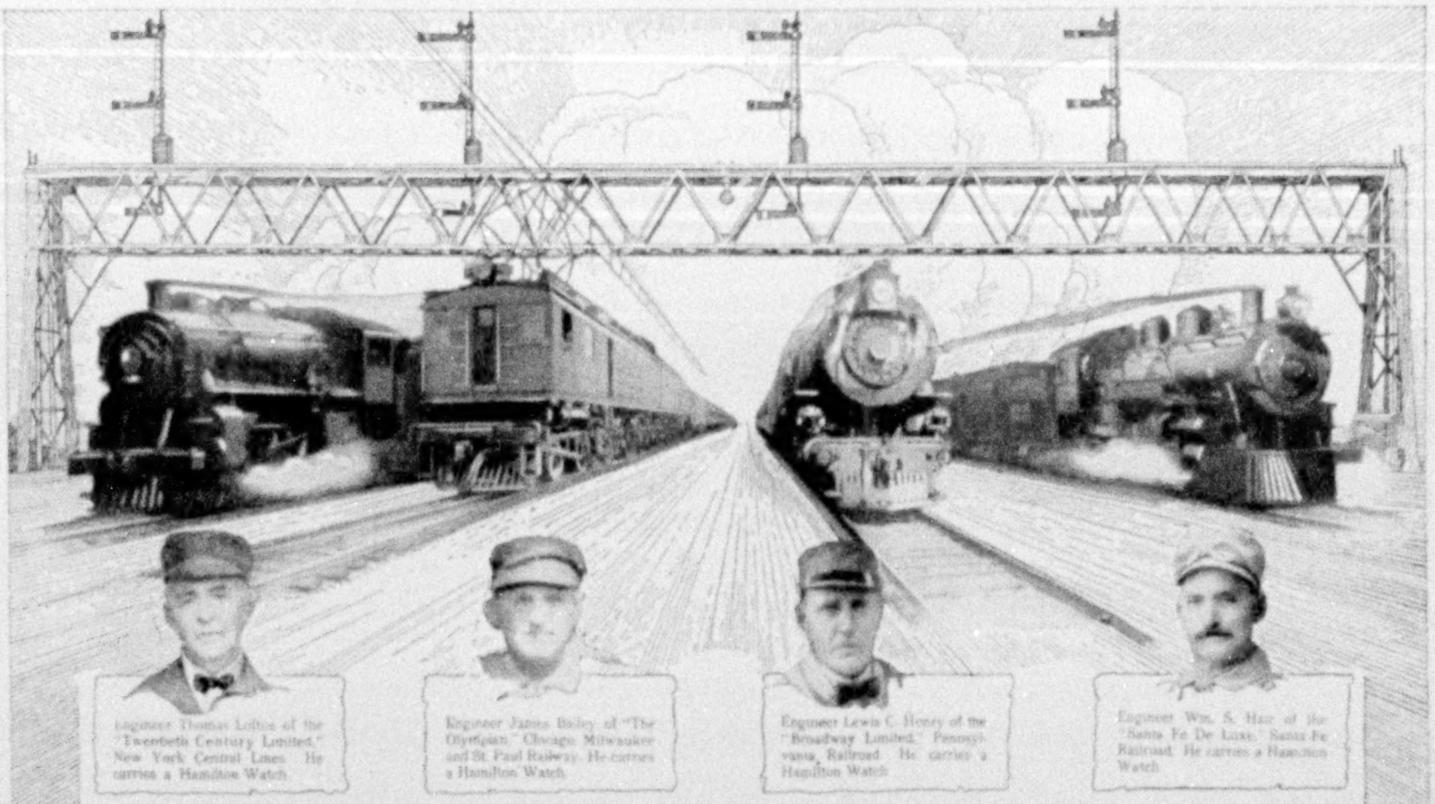

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Let us send you a copy of this book. It illustrates and describes all Hamilton models for men and women and is full of interesting watch information. The lowest-priced Hamilton is a movement alone for $12.25 ($13.00 in Canada). The highest-priced Hamilton is our Masterpiece at $150.00 in 18k extra heavy gold case. Other Hamiltons at $25.00, $28.00, $40.00, $55.00, $80.00, $110.00, etc. All have Hamilton accuracy, beauty and durability. Hamiltons are made in many models—in cased watches: also in movements alone which your jeweler can fit to your present watch case.

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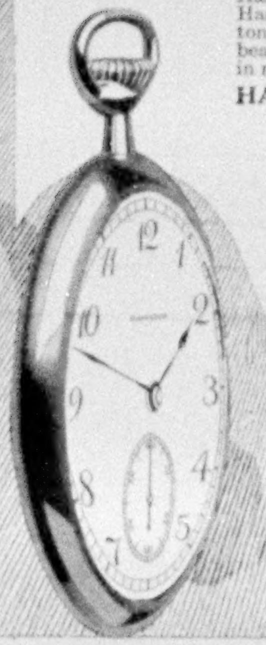

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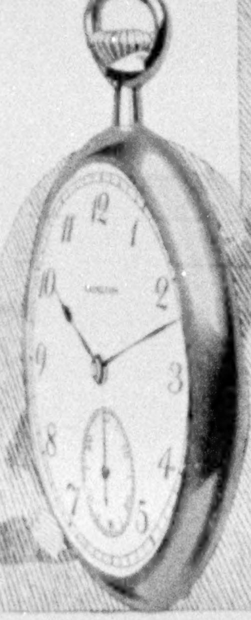
"The Watch of Railroad Accuracy"



"*The* Delights of Getting Well"

When advised by your Physician to take "THE CURE" abroad, you do not begin to think about Sanatoriums or Hospitals, nor anticipate a disagreeable experience. Rather, you picture visions of up-to-date Hotels, interesting surroundings, unusual and celebrated people, and agreeable out-of-door diversions.

To take "THE CURE" means all these, and also, certain Baths and Treatments, the Drinking of Medicinal Waters and Systematic, Out-of-door Exercise; none of which interferes with the pleasures of your outing. So "You make a delight of getting well."

Do not imagine that because of conditions in Europe, it is impossible to take "THE CURE." There is just one place in America that combines all of these pleasurable features, together with the Treatments and Medicinal Waters. That place is Hotel Chamberlin, Old Point Comfort, one of the great Resort Hotels of America. Midway between the North and the South, it is climatically perfect the year-round. Its unique surroundings, by land and sea, give it the "something different" atmosphere. The Cuisine is celebrated the world over.

A NEW EIGHTEEN-HOLE GOLF COURSE

And finally, the Treatments and Baths at The Chamberlin are the most scientifically administered in America. Every Treatment given at Aix, Vichy, Karlsbad, Nauheim, or Harrogate is duplicated here under ideal conditions. The Chamberlin Saline Water, flowing from a depth of 900 feet, is wonderfully effective in many Complaints due to the presence of uric acid. This water is highly Radio-active, which adds to its medicinal properties.

Several interesting books telling of our Methods, describing the various Treatments and enumerating the Complaints we relieve, will gladly be sent on application. Address

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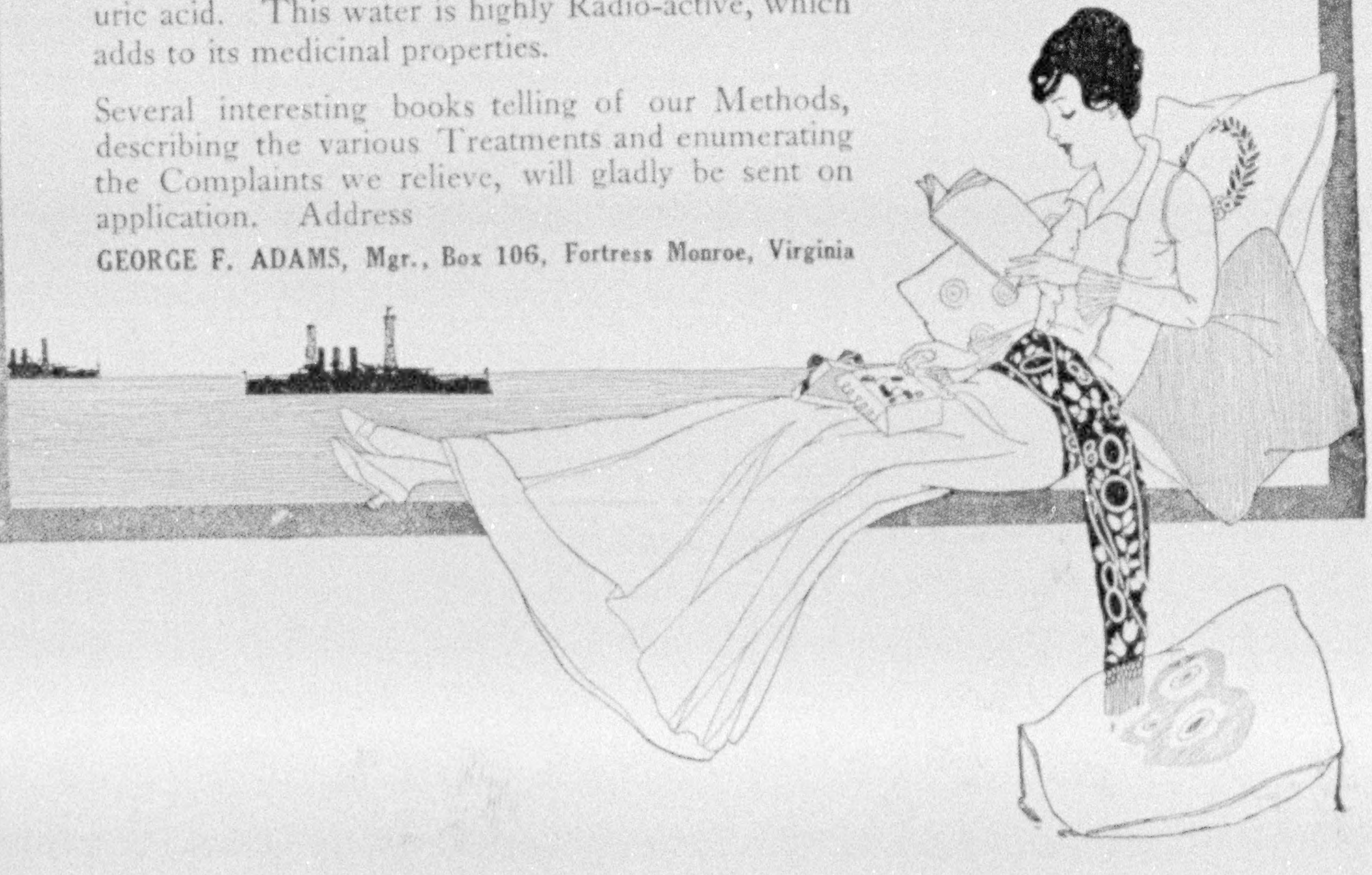
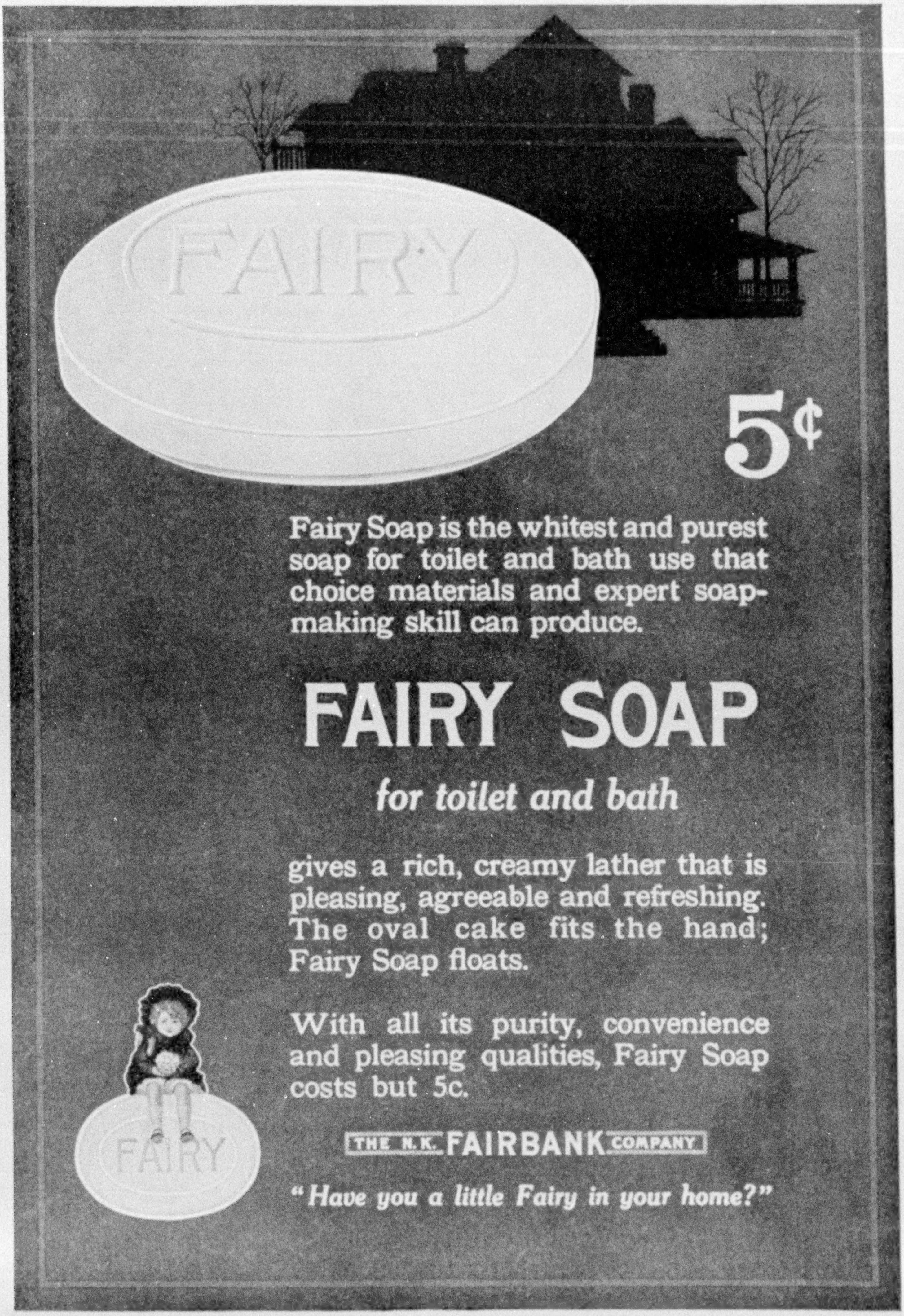




5¢

Fairy Soap is the whitest and purest soap for toilet and bath use that choice materials and expert soap-making skill can produce.

FAIRY SOAP

for toilet and bath

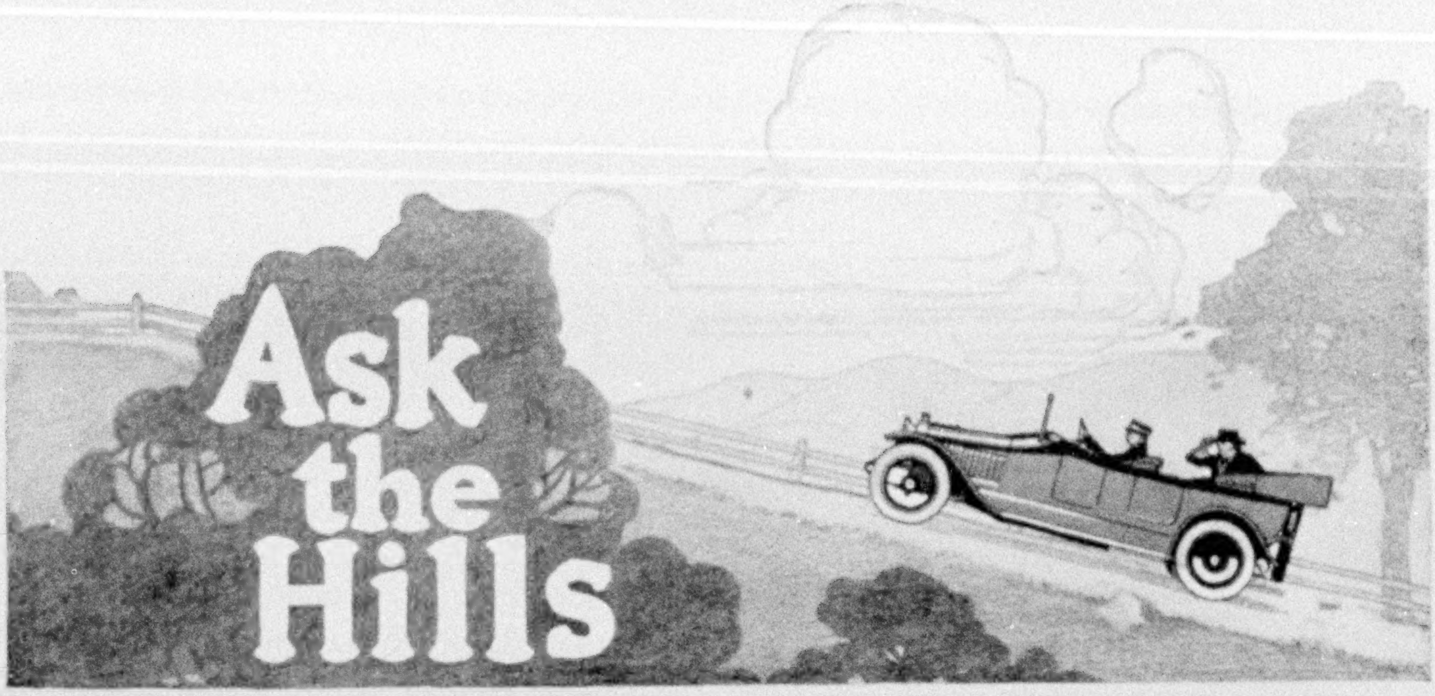
gives a rich, creamy lather that is pleasing, agreeable and refreshing. The oval cake fits the hand; Fairy Soap floats.

With all its purity, convenience and pleasing qualities, Fairy Soap costs but 5c.

THE N.K. FAIRBANK COMPANY

"Have you a little Fairy in your home?"

XUM



HILLS often exact full power from your motor. Poor compression resulting from wrong oil becomes quickly apparent.

Hot metal grows hotter. The laboring of the engine plainly says something is wrong.

You blame the engine, but how often *the engine blames you*—for expecting full compression from an oil which lets power gases escape past the piston rings.

A thorough piston ring seal is essential to full compression and full power. How much this piston ring seal depends on the oil's *body* and *quality* is shown by the hill test.

Make This Test.

Pick out a long hard hill where you have had to change gears. See how far up you can go on high gear with your present oil. Then drain off the oil. Refill the crank case with the correct grade of Gargoyle Mobiloils. This will probably cost you less than a dollar. Make sure that the road and operating conditions and speed of the car at the foot of the hill are identical in each trial.

The greater distance that the correct grade of Gargoyle Mobiloils will carry you up the hill without gear-change represents greater actual horse-power—better compression and more power resulting from better piston ring seal.

You get this greater efficiency on the level stretches as well as on the hills. It is simply less apparent.

If your car is not listed in the partial Chart on this page a complete Chart will be mailed you on request.

GARGOYLE

Mobiloils

A grade for each type of motor

The four grades of Gargoyle Mobiloils for gasoline motor lubrication, purified to remove free carbon, are:

Gargoyle Mobiloil "A"
Gargoyle Mobiloil "B"
Gargoyle Mobiloil "E"
Gargoyle Mobiloil "Arctic"

Electric Vehicles—For motor bearings and enclosed chains use Gargoyle Mobiloil "A" the year 'round. For open chains and differential use Gargoyle Mobiloil "C" the year 'round. *Exception*—For *winter lubrication* of pleasure cars use Gargoyle Mobiloil "Arctic" for worm drive and Gargoyle Mobiloil "A" for bevel gear drive.

In buying Gargoyle lubricants from your dealer, it is safest to purchase in original packages. Look for the red Gargoyle on the container. For information, kindly address any inquiry to our nearest office.

VACUUM OIL COMPANY

Rochester, N. Y., U. S. A.

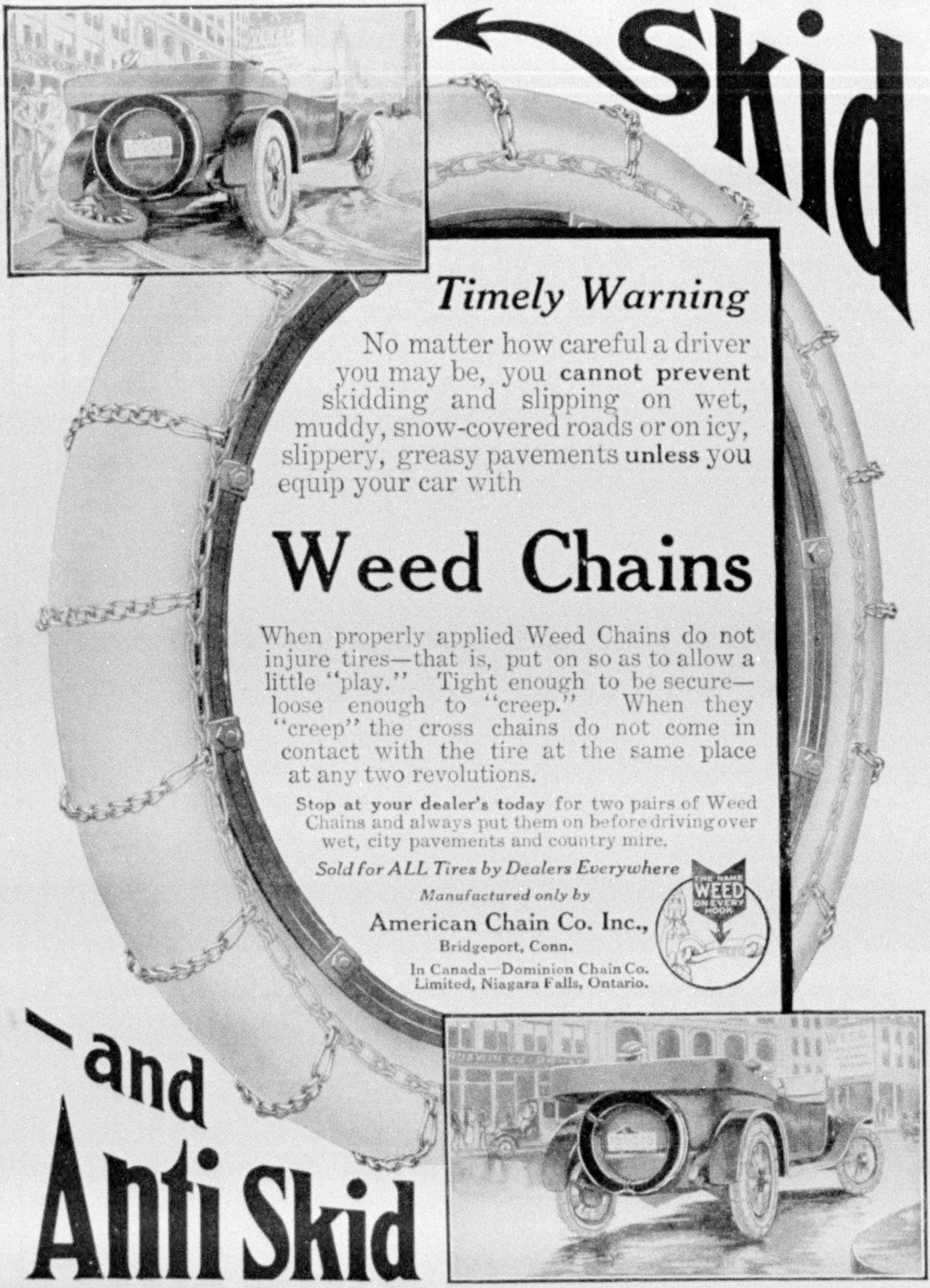
Specialists in the manufacture of high grade lubricants for every class of machinery. Obtainable everywhere in the world.

Domestic Branches:	Detroit Boston New York	Chicago Philadelphia Indianapolis	Minneapolis Pittsburgh Kansas City, Kan.

Correct Automobile Lubrication

Explanation: In the Chart below, the letter opposite the car indicates the grade of Gargoyle Mobiloils that should be used. For example, "A" means Gargoyle Mobiloil "A," "Arc" means Gargoyle Mobiloil "Arctic," etc. The recommendations cover all models of both pleasure and commercial vehicles unless otherwise noted.

MODEL OF	1916		1915		1914		1913		1912	
CARS	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Abbott Detroit	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc	A	Arc
" (8 cyl)	A	A	A	A						
Apperson	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A								
Auburn (4 cyl)	A	Arc	A	Arc	A	A	A	A	A	A
" (6 cyl)	Arc	Arc	Arc	Arc	Arc	Arc				
Autocar	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Avery	A	A	A	A	A	A	A	A	A	A
" (Mod. 5&C, 1 Ton)	Arc	Arc	Arc	Arc	Arc	Arc				
Briscoe	A	Arc	A	Arc	A	Arc				
" (8 cyl)	A	A								
Buick	Arc	Arc	Arc	Arc	A	Arc	A	Arc	A	Arc
Cadillac					Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A	Arc	Arc						
Case	A	A	A	Arc	A	Arc	A	Arc	A	Arc
Chalmers	Arc	Arc	Arc	Arc	A	A	Arc	Arc	Arc	Arc
" (Model 6-40)	A	Arc								
" (Model 6-30)	A	A								
Chandler Six	Arc	Arc	Arc	Arc	Arc	Arc				
Chase (air)	B	B	B	B	B	B	B	B	B	B
" (water)	Arc	Arc	Arc	Arc	Arc	Arc				
Chevrolet	Arc	Arc	Arc	Arc	A	Arc	A	A		
Cole	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A	A	A						
Cunningham			Arc	Arc	Arc	Arc	A	A	A	A
Delaunay Belleville			B	A	B	A	B	A	B	A
Detroiter	Arc	Arc	A	Arc	A	A	A	Arc	A	Arc
" (8 cyl)			Arc	Arc						
Dodge	A	Arc	E	E						
Empire			Arc	Arc	Arc	Arc	Arc	Arc	A	Arc
Federal	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Fiat	B	A	B	A	B	A	B	A	A	A
Ford	E	E	E	E	E	E	E	E	E	E
Franklin	A	A	A	A	A	A	A	Arc	A	Arc
Grant	A	Arc	Arc	Arc	Arc	Arc				
Haynes	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
" (12 cyl)	A	A								
Hudson	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc	A	Arc
" Super Six	A	A								
Hupmobile	A	Arc	A	Arc	A	Arc	A	Arc	Arc	Arc
I. H. C. (air)			B	A	B	A	B	A		
" (water, 2 cycle)	A	A	A	A	A	A	A	A		
" (water, 4 cycle)	A	Arc								
Jackson	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc	A	Arc
" (8 cyl)	A	A								
Jeffery	A	Arc	A	Arc	A	A				
" (Chesterfield)	A	Arc	A	Arc						
" Com'l	A	Arc	A	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Kearns	E	E	E	E						
" Com'l	A	Arc	A	Arc						
Kelly Springfield	A	A	A	A	A	A	Arc	Arc	Arc	Arc
King			A	Arc	A	A	A	E	A	E
" (8 cyl)	A	A	Arc	Arc						
" Com'l	Arc	Arc	Arc	Arc	Arc	Arc				
Kissel Kar	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
" " Com'l	A	Arc	A	Arc	A	Arc	Arc	Arc	Arc	Arc
" " (Model 48)	A	A	A	A	A	A				
Knox	B	A	B	A	B	A	B	A	B	A
" (Model 35)	A	A	A	A						
Locomobile	E	E	E	E	E	E	Arc	Arc	Arc	Arc
Lozier	A	Arc	A	Arc	A	Arc	Arc	Arc	Arc	Arc
Marion	A	Arc	Arc	Arc	Arc	Arc	A	Arc	A	Arc
Marmon	A	A	A	Arc	A	Arc	A	Arc	A	Arc
Maxwell	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Mercer			A	Arc	A	Arc	A	Arc	A	Arc
" (22-70)			Arc	Arc						
" (22-72)	A	A								
Mitchell	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
" (8 cyl)	A	A								
Moline							A	Arc	A	Arc
" Knight	A	A	A	A	A	A				
Moon (4 cyl)			Arc	Arc	A	Arc	Arc	Arc	Arc	Arc
" (6 cyl)	Arc	Arc	Arc	Arc	Arc	Arc				
National	A	Arc	A	Arc	A	A	A	A	A	A
" (12 cyl)	A	A								
Oakland	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc	A	Arc
" (8 cyl)	A	A								
Oldsmobile	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc
" (8 cyl)	A	A								
Overland	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Packard			A	Arc	A	Arc	Arc	Arc	Arc	Arc
" (12 cyl)	A	A								
" Com'l	A	A	A	A						
Paige			A	Arc	A	A	A	E	A	E
" (6-46)	Arc	Arc	Arc	Arc						
" (6-36 & 38)	A	Arc	A	Arc						
Pathfinder	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc		
" (12 cyl)	A	A								
Peerless	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A								
Pierce Arrow	A	A	Arc	Arc	Arc	Arc	Arc	Arc	A	Arc
" " Com'l	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Premier	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Regal	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
" (8 cyl)	A	A	Arc	Arc						
Renault	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Reo	A	Arc	A	Arc	A	Arc	A	Arc	A	Arc
Richmond	Arc	Arc	A	Arc	A	Arc	Arc	Arc		
Saxon	E	E	E	E	E	E				
Selden	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Simplex	A	A	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Stearns Knight	B	A	B	A	B	A	A	A	A	A
" " (8 cyl)	B	A								
Stevens Duryea			Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Studebaker	A	Arc	Arc	Arc	A	Arc	A	Arc	Arc	Arc
Stutz	A	A	A	A	A	A	Arc	Arc	Arc	Arc
Velie (4 cyl)			A	Arc	A	Arc	A	Arc	A	Arc
" (6 cyl)	Arc	Arc	Arc	Arc	Arc	Arc				
White	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc
Willys Knight	B	A	B	A	A	A				
Winton	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc	Arc


Skid
and
Anti Skid
THE NAME WEED ON EVERY HOOK

Timely Warning

No matter how careful a driver you may be, you **cannot prevent** skidding and slipping on wet, muddy, snow-covered roads or on icy, slippery, greasy pavements **unless** you equip your car with

Weed Chains

When properly applied Weed Chains do not injure tires—that is, put on so as to allow a little "play." Tight enough to be secure—loose enough to "creep." When they "creep" the cross chains do not come in contact with the tire at the same place at any two revolutions.

Stop at your dealer's today for two pairs of Weed Chains and always put them on before driving over wet, city pavements and country mire.

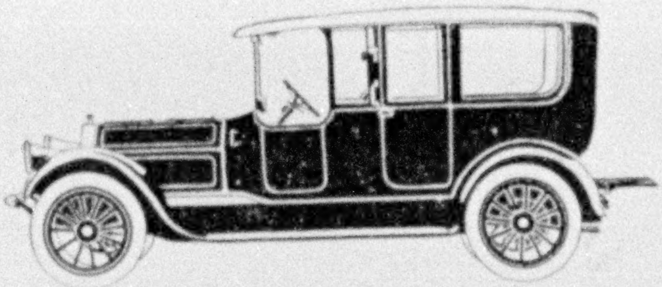
Sold for ALL Tires by Dealers Everywhere

Manufactured only by

American Chain Co. Inc.,
Bridgeport, Conn.

In Canada—Dominion Chain Co.
Limited, Niagara Falls, Ontario.

COMFORT



Comfort is a homelier word than "luxury," but it is a necessary ingredient of luxury. Without comfort there can be no luxury.

The comfort of the Pierce-Arrow Car is something more than physical comfort. It is equally mental comfort—freedom from anxiety, from fear, and from disappointment. It is not merely soft cushions, absence of vibration and the minimum of noise; it is also the mental rest that comes from the conviction that all these qualities are permanent and dependable; that they are not the result of some supreme effort on some particular car, but that they are all a part of the regular day's work—the natural and customary product of the car.

THE PIERCE-ARROW MOTOR CAR CO · BUFFALO N Y

PIERCE-
ARROW

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The thrilling motor run over the **Old Apache Trail** is the crowning feature of the journey of scenic pleasures on the

SUNSET LIMITED

And other splendid trains

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You can enjoy this motor side trip over America's oldest highway, visiting the copper camps, prehistoric cliff-dwellings and the great Roosevelt Dam, at only slight additional cost. Through Pullman service in connection with the Sunset Limited between El Paso and Globe, starting point of the motor trip, on Sundays, Tuesdays and Fridays. Oil-burning locomotives—no dust, no smoke, no cinders.

SOUTHERN PACIFIC LINES

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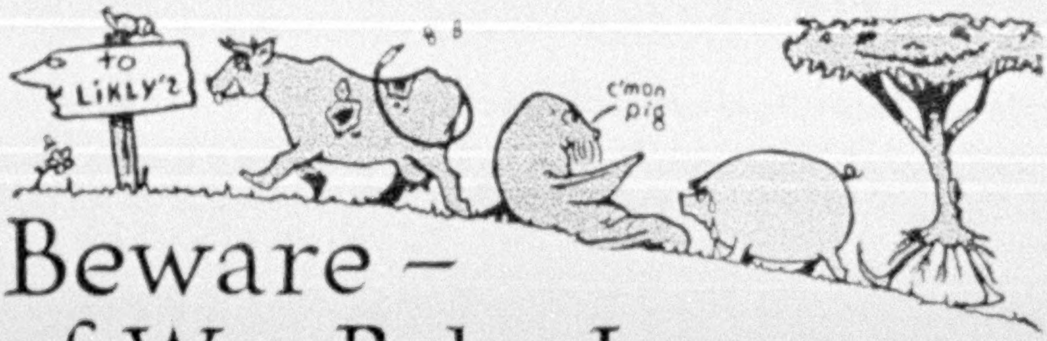
366 Broadway

SAN FRANCISCO
Flood Bldg.

NEW ORLEANS
Metropolitan Bank Bldg.

HOUSTON
Southern Pacific Bldg.

SOUTHERN LINES PACIFIC



Beware – of War-Baby Luggage

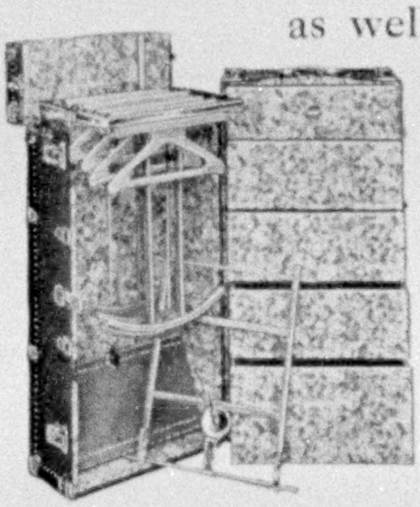
NEVER was the Likly trademark so important to you. Tempters now work overtime in luggage factories. They nudge bosses' ribs. They point to rising costs. "Skimp," they sotto-voce. "Play shoddy," they urge. Our answer to the Tempters is barred doors and windows.

The handsomest Cows, Oxen, Pigs and Walruses still send their hides to Likly. For Likly the tallest basswood trees sing their strong-timbered "bass." (O-o-o! *That's cruel!*) And mills get from Likly full price for their best in ducks, fibre and linings.

Every Likly trunk or travel bag is sired by Honest Purpose out of Rugged Materials. Nothing war-babyish about *that*.

New—an open-top Likly Wardrobe

A trunk that waits on itself as well as you



A nearby dealer now asks to show you this new Likly Wardrobe. It has the toughest constitution ever built into an open-top trunk. Dreadnought reinforcing, minus weight or clumsiness. Braced to defy the huskiest, bustiest Baggage Man alive. Skyscraper rigidity.

And, talk about room! Why, 18 to 20 gowns, or 10 to 12 men's suits just dote on traveling in this wrinkle-proof wardrobe. With top up every garment is at your fingers' ends.

Look under the hangers. That sack-like compartment is for shoes. Or you may use it for soiled linen.

Turn to the other side. Notice the position of the lock. Placed high so you can lock or unlock without cricking your back or getting a stitch in your side.

This cast-bronze lock is of the paracentric tumbler type. Exclusive. STRONG. Locks itself as you close it.

More—locks all five drawers in position. Locks the whole trunk into a unit of defiance to hard knocks. No catches to chip chips off your finger nails. No dowels. Lock opens automatically at a touch of the key.

The 5 roomy drawers are staunchly made. Removable hat fixtures. The foundation box of the trunk is of strongest basswood Trunk and drawers are split-proof, warp-proof, crack-proof.

Trunk is covered and lined with vulcanized fibre. Bound with walnut fibre. Most attractively lined.

Prices of Likly *Open-Top* Wardrobe Trunks range from $35.00 to $125.00.

Or the dealer will show you a wide range of Likly *Closed-Top* Models at from $20.00 to $85.00.

Likly Luggage is the widest line of luggage produced today. Comes in every conceivable type of trunk or travel bag. Every piece packed with the ripe experience of 72 years. And every piece carries this brass-and-black trademark:

LIKLY

Send for our 72-page catalog. It describes the full line of Likly Luggage. Tells how to judge a piece of luggage. Gives points of difference between the "Likly" kind and others. Address

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Asks no favors of the baggage man

Furs of Superior Quality

Exclusive in Design

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Furriers exclusively for ninety-six years

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June Comfort in January

That's what you want—comfort. The comfort of evenly distributed heat all through the house, during the coldest weather and highest winds. Every room kept at the same temperature, no matter what its exposure is.

You can get June comfort indoors throughout the winter by putting Monarch Metal Weather Strips on your windows and doors. By sealing the cracks between sash and frame and around the doors, they prevent cold air from getting in and warm air from leaking out. That's the whole secret of heating efficiency.

Comfort increased—cold drafts eliminated. Dust and soot kept out also, making a cleaner and pleasanter house. And besides all this you have a tremendous saving in heating expense.

MONARCH strips can be easily installed on old windows as well as new.

Licensees everywhere who will call on you by appointment, demonstrate, and estimate cost of installation without any obligation on your part.

Write us for Booklet—
"Evolution of the Window."

Monarch Metal Weather Strip Co.
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MONARCH
METAL WEATHER STRIPS

STERLING BRONZE CO
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NEW YORK

FOR CHRISTMAS 1916
WE OFFER A SERIES OF
STERLING LAMPS, CLOCKS ETC.
AT PRICES RANGING FROM
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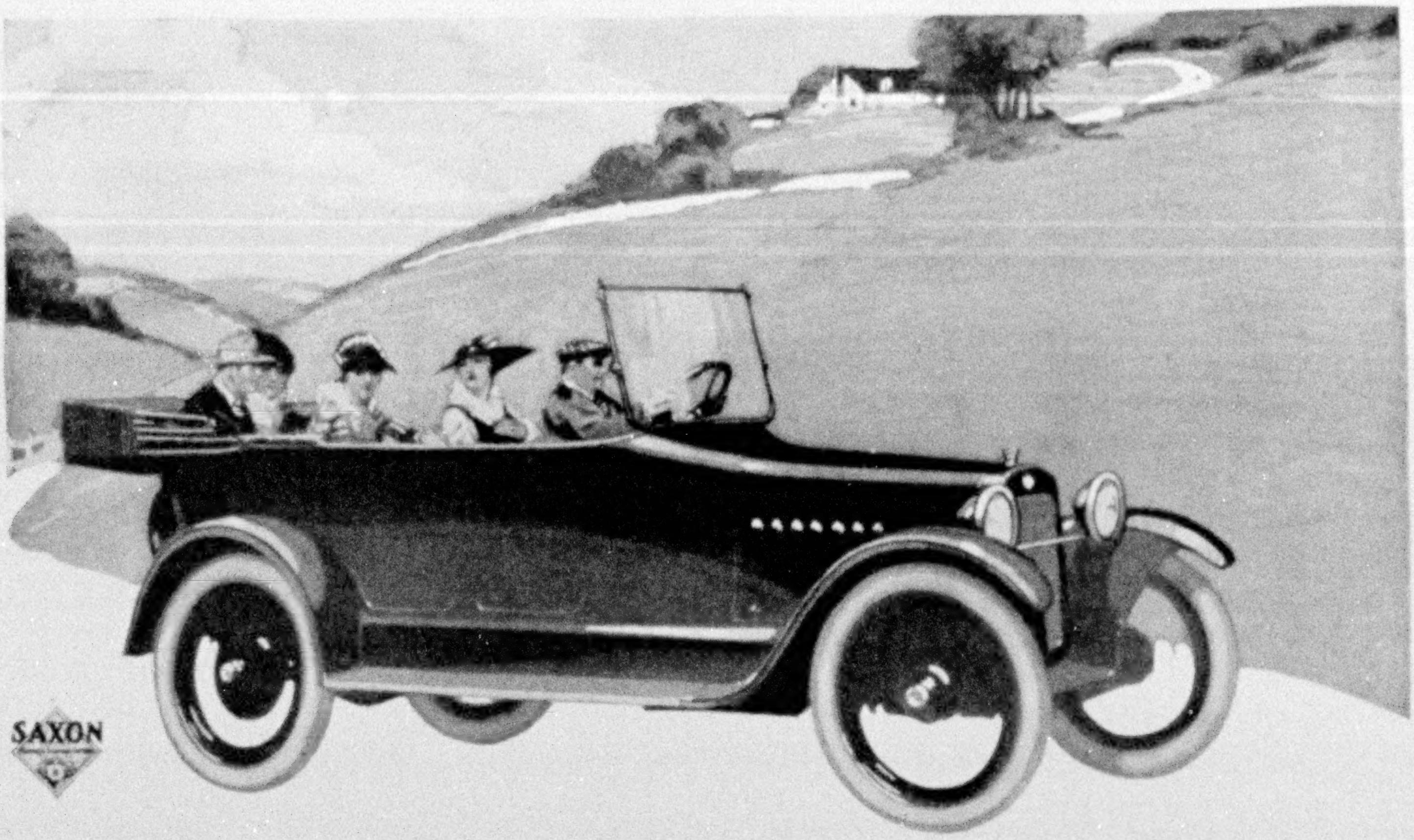

This Preference for Saxon "Six"

Is Based Upon Very Definite Reasons

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We have told you time and again that the Saxon "Six" motor—both because of its type and its high development—is far superior to a motor of fewer cylinders.

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The reason for this change is found in the superiority of the Saxon "Six" motor.

Between the power-impulses produced by a "less-than-six-cylinders" motor there are intervals. That is a mechanical truth.

These intervals are responsible for vibration. And vibration is a dread danger to a motor.

It impairs flexibility, slows up acceleration, makes a difference of degrees in the quietness of operation, increases repair-service costs, and finally takes nearly 50 per cent from the standard efficiency of the motor.

In the Saxon "Six" motor, on the contrary, you get a power-flow of uniform, constant torque, that is, perfect smoothness or continuity.

Vibration is practically nil. Briefly, that is why Saxon "Six" excels in pulling power, in acceleration, in high-gear work, in flexibility.

And that is why the cost of repairs on Saxon "Six" is so insignificant.

In this connection it is enlightening to note that the figures on the cost of all repair parts bought by all Saxon "Six" owners during the past two years show that the cost per car averages $8.50.

You will find the value of the highly efficient Saxon "Six" motor demonstrated in another definite advantage.

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At 1½ miles per hour "on high" the motor pulls smoothly without "bucking" or jerking. At full speed you feel safe and secure.

Saxon "Six" is $815 f. o. b. Detroit. (572)

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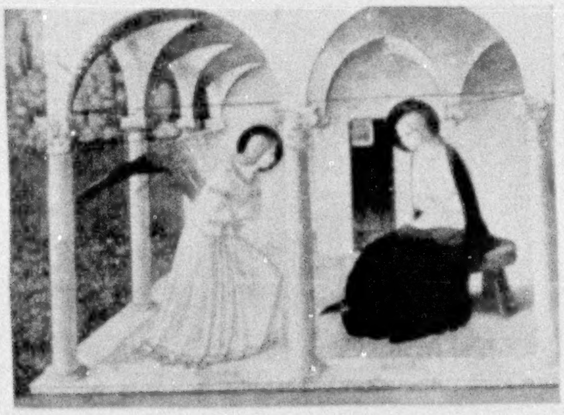

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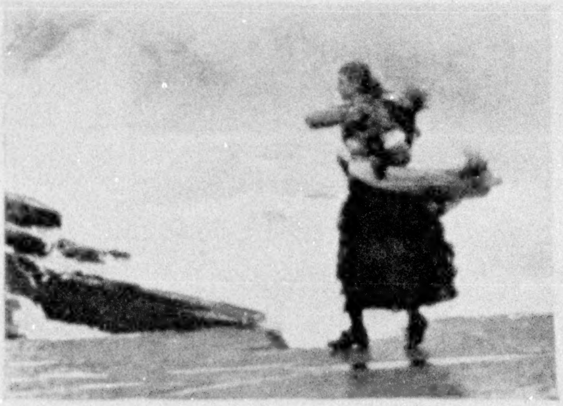

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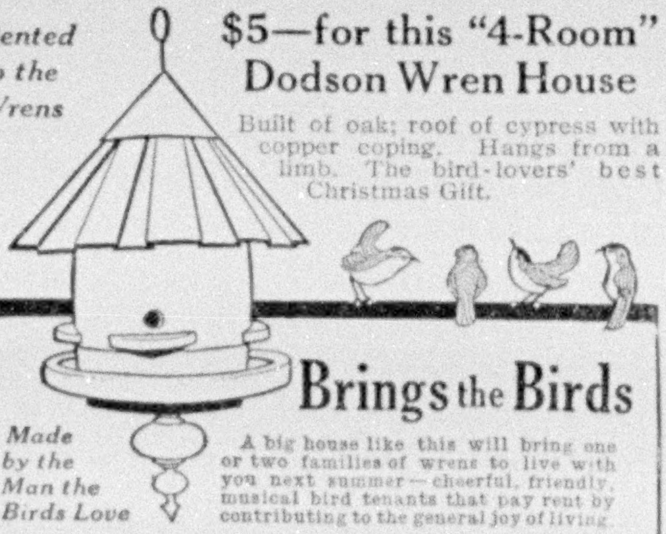

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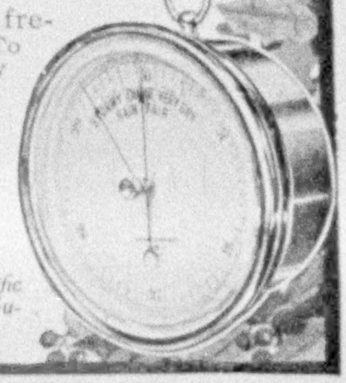

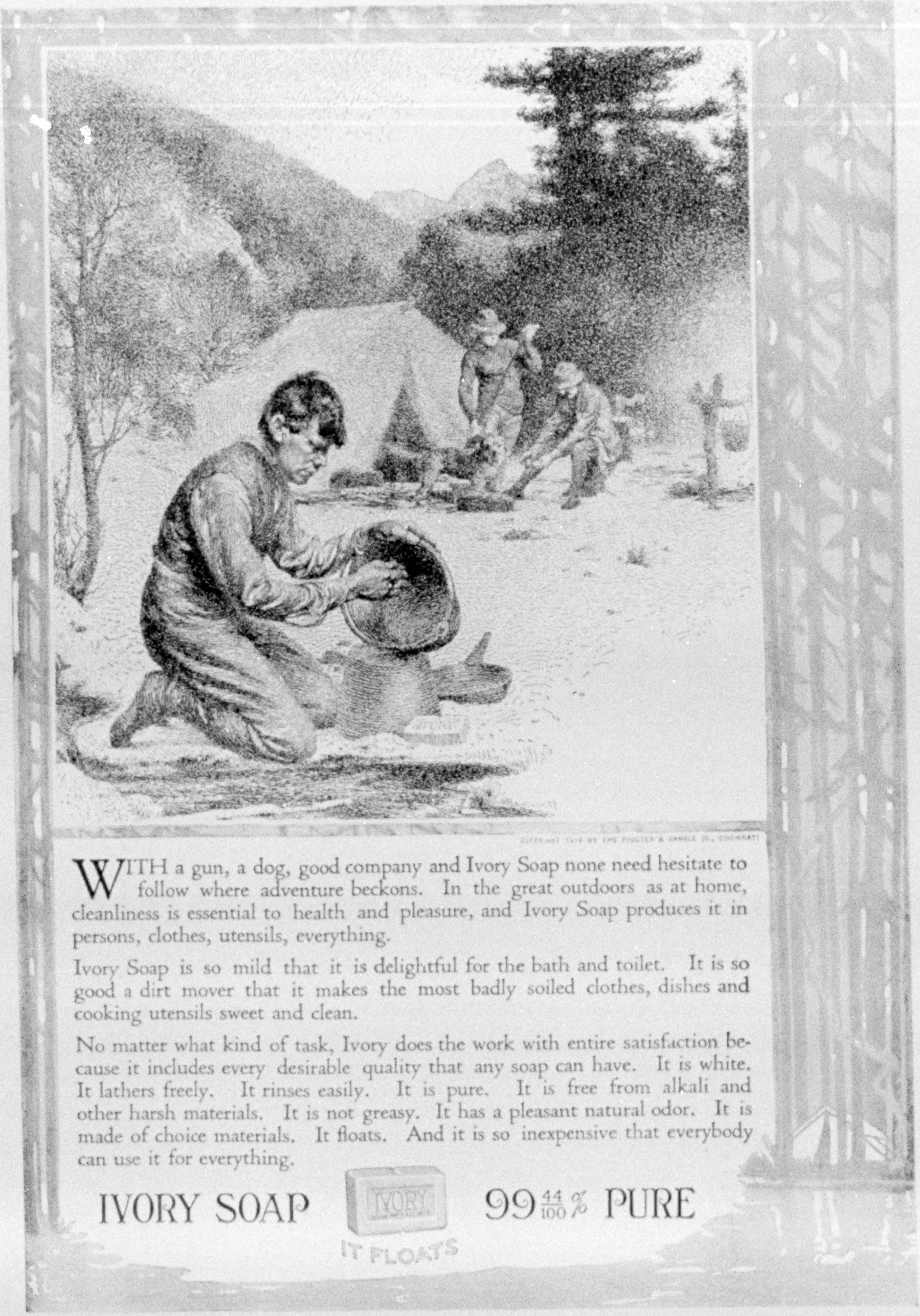

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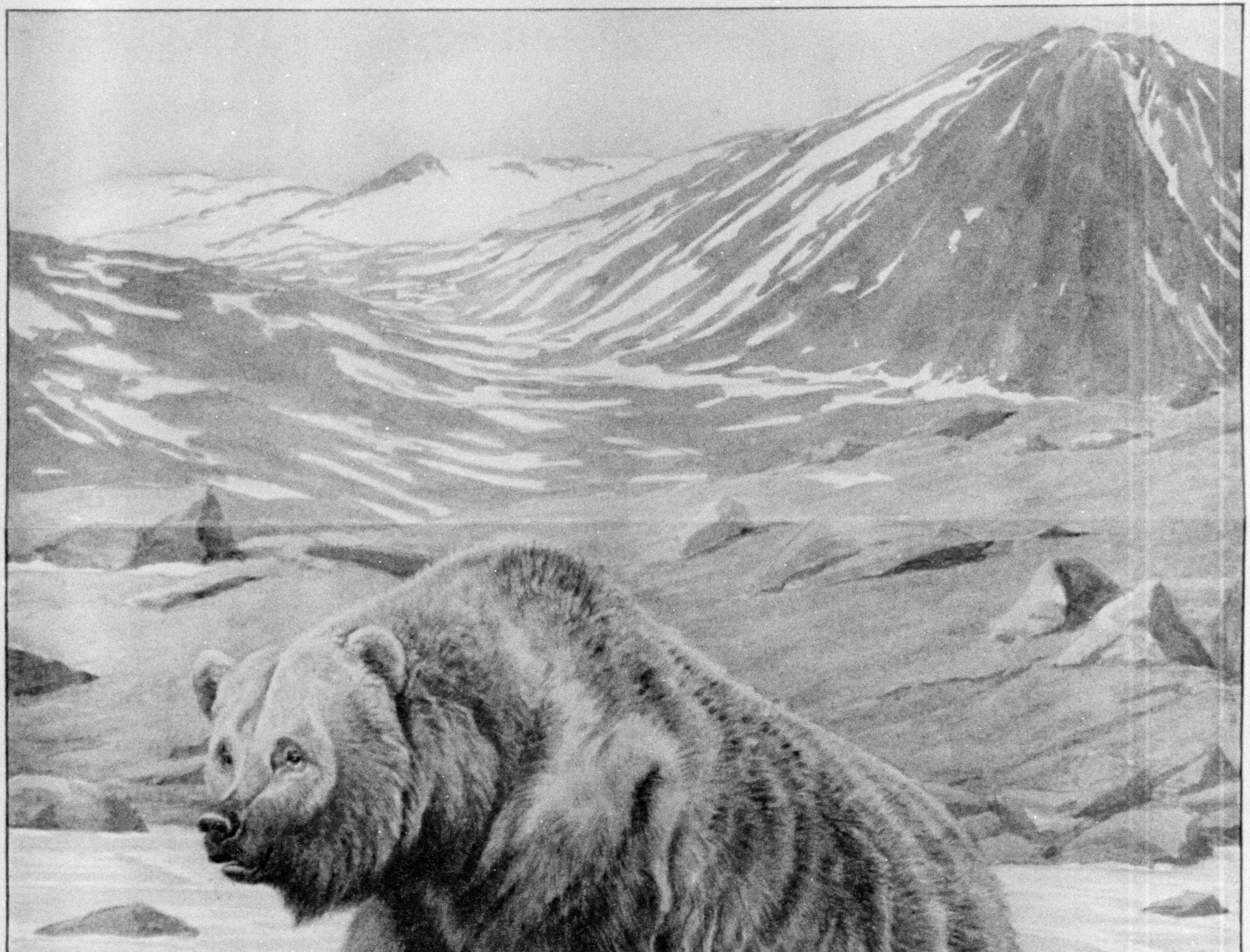

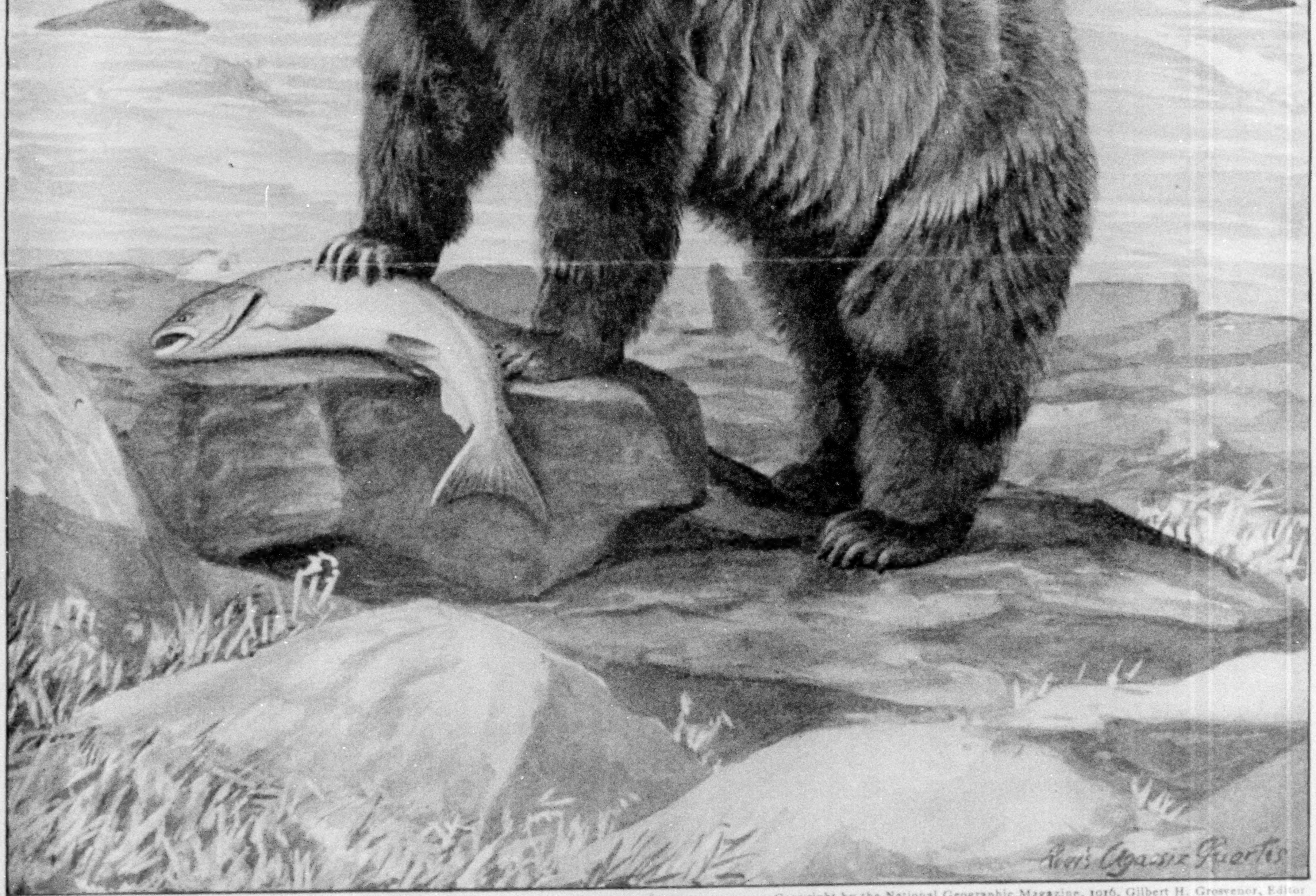

From a drawing by Louis Agassiz Fuertes

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THE LARGEST CARNIVOROUS ANIMAL EXTANT
THE ALASKA BROWN BEAR

The great brown bear of the Alaska peninsula, *Ursus gyas*, and his cousin, *Ursus middendorfi*, of Kodiac Island, are the largest of all bears, as well as the largest carnivorous animals in the world. While sometimes attaining a weight of 1500 pounds, they are, as a rule, inoffensive giants, taking flight at the first sight of man. But when wounded, or surprised at close quarters, they give battle, and their enormous size, strength and activity render them terrific antagonists. The world did not know of the existence of these bears until 1898. During the spring the Alaska brown bear lives upon the salmon which come up the rivers and creeks to spawn, while in the summer and fall they eat the sedge of the lowland flats, grazing like cattle, and varying their diet with small mammals and berries which they find in the hills. The comparatively limited and easily accessible territory in which they live renders their future precarious unless reasonable means for their proper protection are continued.

VOL. XXX, NO. 5 WASHINGTON NOVEMBER, 1916

THE NATIONAL GEOGRAPHIC MAGAZINE

THE LARGER NORTH AMERICAN MAMMALS

By E. W. NELSON

ASSISTANT CHIEF, U. S. BIOLOGICAL SURVEY

With illustrations from paintings by Louis Agassiz Fuertes

Readers of THE GEOGRAPHIC *will be glad to learn that this number is the forerunner of another by Messrs. Nelson and Fuertes to be devoted to the portrayal and study of the smaller mammals of our continent. So great is the potential as well as the practical value along educational lines of this remarkable series of animal studies that* THE GEOGRAPHIC *has not hesitated to expend $40,000 in its publication. We congratulate our readers who have made such an achievement possible by their enthusiastic interest and support.*

AT THE time of its discovery and occupation by Europeans, North America and the bordering seas teemed with an almost incredible profusion of large mammalian life. The hordes of game animals which roamed the primeval forests and plains of this continent were the marvel of early explorers and have been equaled in historic times only in Africa.

Even beyond the limit of trees, on the desolate Arctic barrens, vast herds containing hundreds of thousands of caribou drifted from one feeding ground to another, sharing their range with numberless smaller companies of musk-oxen. Despite the dwarfed and scanty vegetation of this bleak region, the fierce winter storms and long arctic nights, and the harrying by packs of white wolves, these hardy animals continued to hold their own until the fatal influence of civilized man was thrown against them.

Southward from the Arctic barrens, in the neighboring forests of spruce, tamarack, birches, and aspens, were multitudes of woodland caribou and moose. Still farther south, in the superb forests of eastern North America, and ranging thence over the limitless open plains of the West, were untold millions of buffalo, elk, and white-tailed deer, with the prong-horned antelope replacing the white-tails on the western plains.

With this profusion of large game, which afforded a superabundance of food, there was a corresponding abundance of large carnivores, as wolves, coyotes, black and grizzly bears, mountain lions, and lynxes. Black bears were everywhere except on the open plains, and numerous species of grizzlies occupied all the mountainous western part of the continent.

Fur-bearers, including beavers, musk-rats, land-otters, sea-otters, fishers, martens, minks, foxes, and others, were so plentiful in the New World that immediately after the colonization of the United States and Canada a large part of the world's supply of furs was obtained here.

Trade with the Indians laid the foundations of many fortunes, and later devel-

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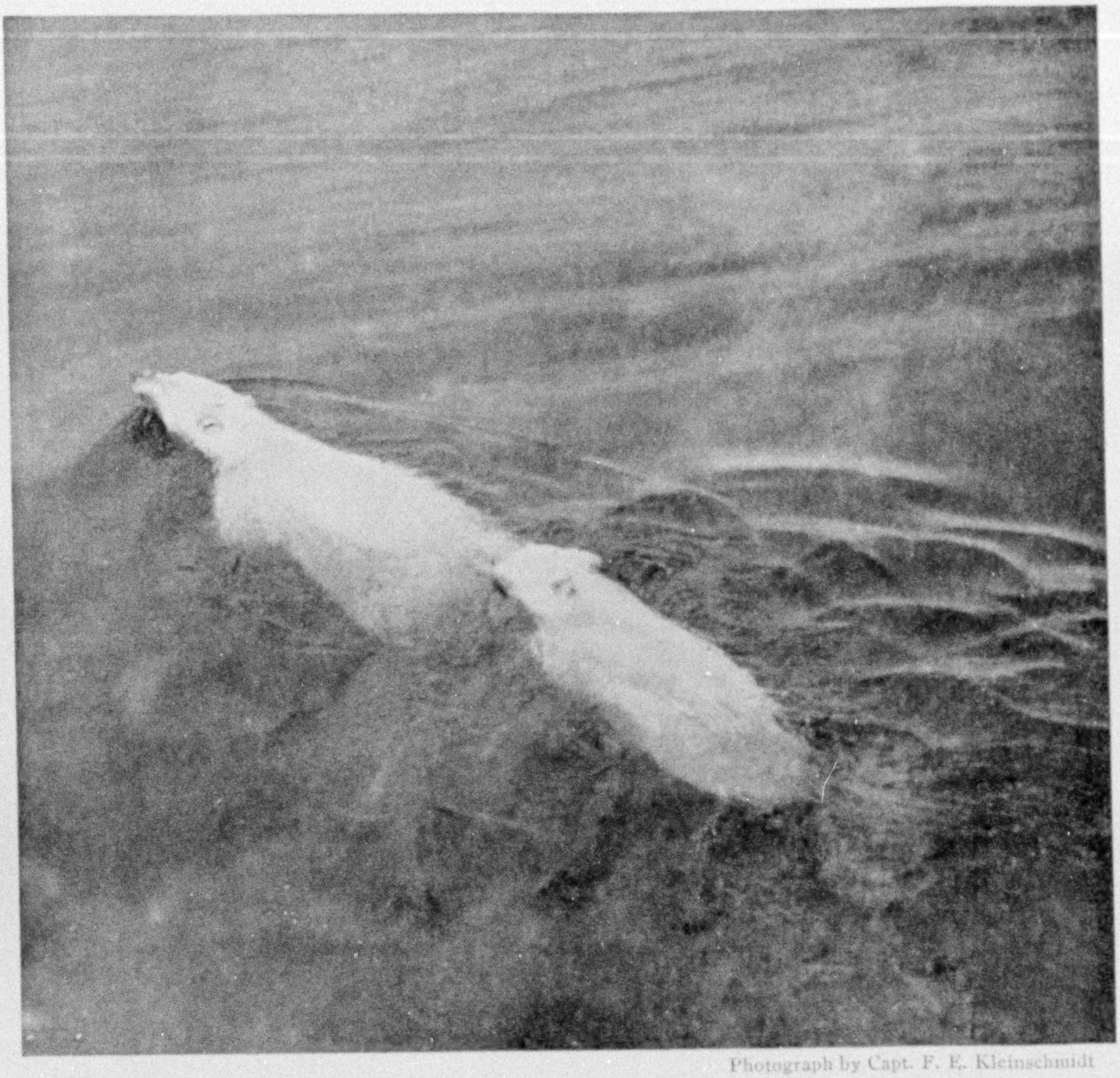


Photograph by Capt. F. E. Kleinschmidt

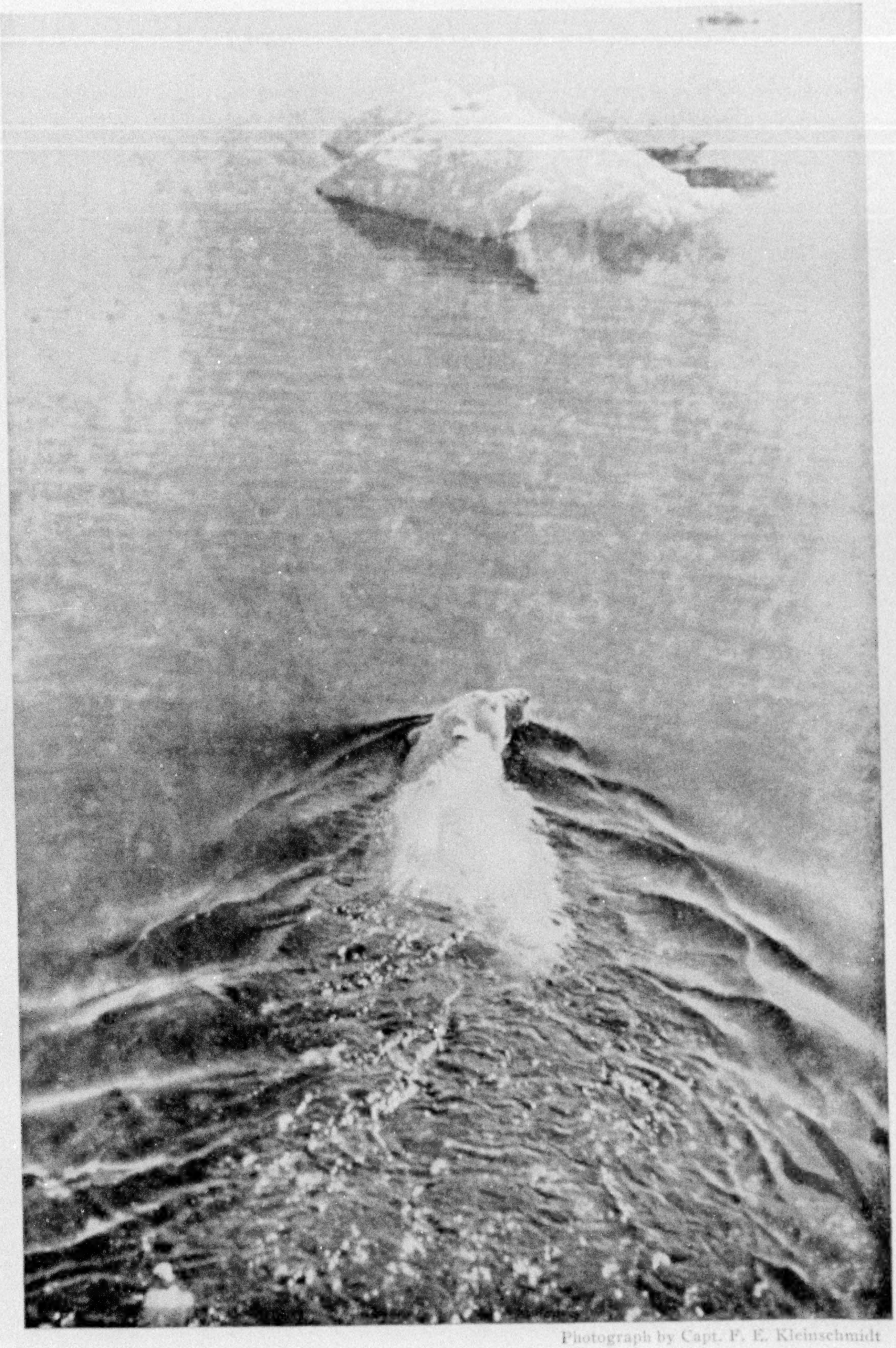
TOWING HER BABY TO SAFETY

When a mother polar bear scents danger she jumps into the water and her cub holds fast to her tail while she tows it to safety. But when no danger seems to threaten she wants it to "paddle its own canoe," and boxes its ears or ducks its head under water if it insists on being too lazy to swim for itself.

oped almost imperial organizations, like the Hudson's Bay Company and its rivals. Many adventurous white men became trappers and traders, and through their energy, and the rivalry of the trading companies, we owe much of the first exploration of the northwestern and northern wilderness. The stockaded fur-trading stations were the outposts of civilization across the continent to the shores of Oregon and north to the Arctic coast. At the same time the presence of the sea-otter brought the Russians to occupy the Aleutian Islands, Sitka, and even northern California.

The wealth of mammal life in the seas along the shores of North America almost equaled that on the land. On the east coast there were many millions of harp and hooded seals and walruses, while the Greenland right and other whales were extremely abundant. On the west coast were millions of fur seals, sea-lions, sea-elephants, and walruses, with an equal abundance of whales and hundreds of thousands of sea otters.

Many of the chroniclers dealing with explorations and life on the frontier during the early period of the occupation of America gave interesting details concerning the game animals. Allouez says that in 1680, between Lake Erie and Lake



Photograph by Capt. F. E. Kleinschmidt

A SWIMMING POLAR BEAR

A polar bear when swimming does not use his hind legs, a new fact brought out by the motion-picture camera

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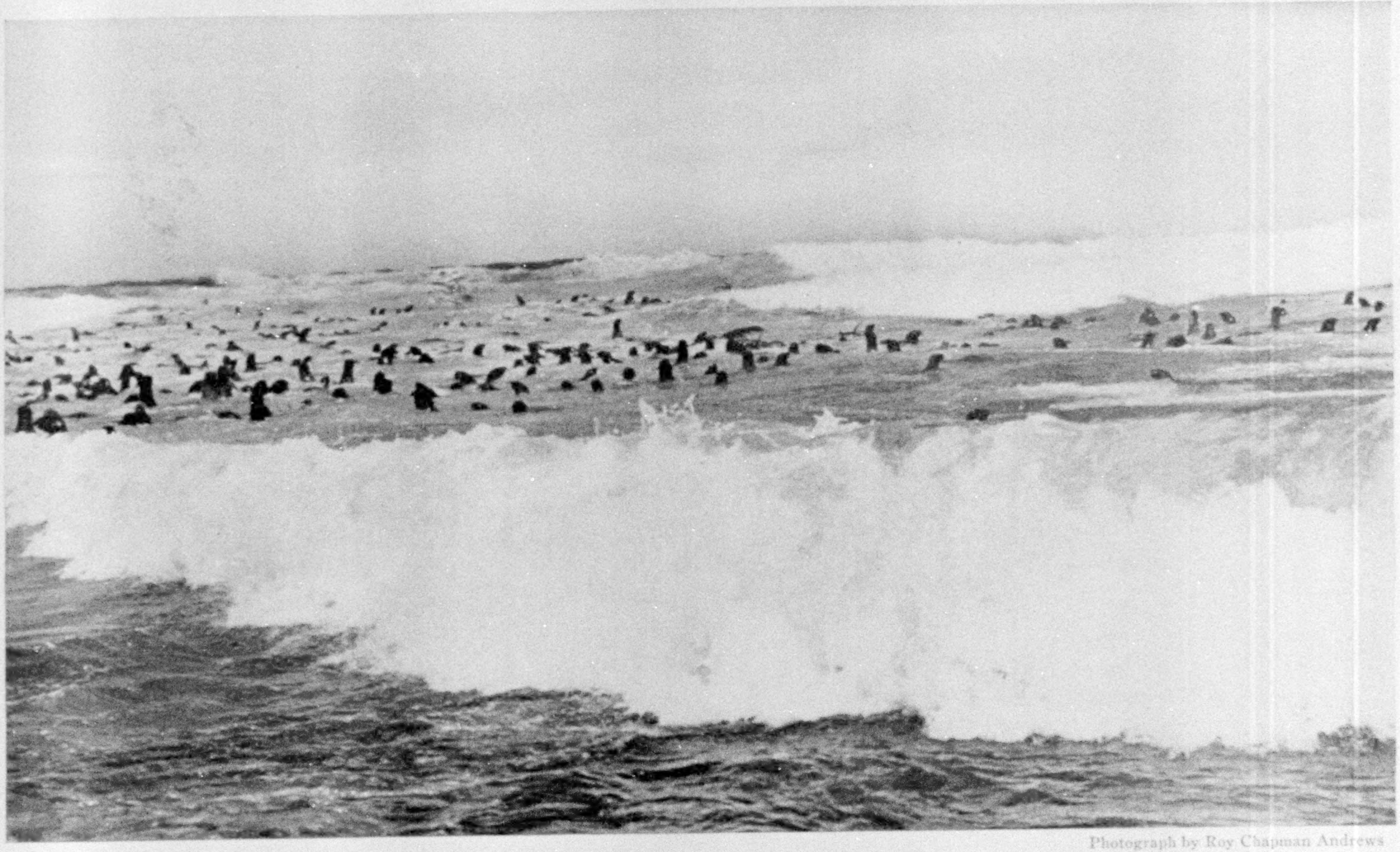


Photograph by Roy Chapman Andrews

FUR SEAL: FEMALES AND YOUNG PUPS

From the ages of one to four years fur seals are extremely playful. They are marvelous swimmers, and frolic about in pursuit of one another, now diving deep, and then, one after the other, suddenly leaping high above the surface in graceful curves, like porpoises.

© Keystone View Co.

ROAMING "MONARCHS OF THE PLAIN": BRITISH COLUMBIA

A remnant of the veritable sea of wild life that surged over American soil before the dikes of civilization compassed it about and all but wiped it out

Michigan the prairies were filled with an incredible number of bears, wapiti, white-tailed deer, and turkeys, on which the wolves made fierce war. He adds that on a number of occasions this game was so little wild that it was necessary to fire shots to protect the party from it. Perrot states that during the winter of 1670-1671, 2,400 moose were snared on the Great Manitoulin Island, at the head of Lake Huron. Other travelers, even down to the last century, give similar accounts of the abundance of game.

TRAINS HELD UP BY BUFFALO

The original buffalo herds have been estimated to have contained from 30,000,000 to 60,000,000 animals, and in 1870 it was estimated that about 5,500,000 still survived. A number of men now living were privileged to see some of the great herds of the West before they were finally destroyed. Dr. George Bird Grinnell writes:

"In 1870, I happened to be on a train that was stopped for three hours to let a herd of buffalo pass. We supposed they would soon pass by, but they kept coming. On a number of occasions in earlier days the engineers thought that they could run through the herds, and that, seeing the locomotive, the buffalo would stop or turn aside; but after a few locomotives had been ditched by the animals the engineers got in the way of respecting the buffaloes' idiosyncrasies. . . .

"Up to within a few years, in northern Montana and southern Alberta, old buffalo trails have been very readily traceable by the eye, even as one passed on a railroad train. These trails, fertilized by the buffalo and deeply cut so as to long hold moisture, may still be seen in summer as green lines winding up and down the hills to and from the water-courses."

Concerning the former abundance of antelope, Dr. Grinnell says: "For many years I have held the opinion that in early days on the plains, as I saw them, antelope were much more abundant than buffalo. Buffalo, of course, being big and black, were impressive if seen in masses and were visible a long way off. Antelope, smaller and less conspicuous in color, were often passed unnoticed, except by a person of experience, who

Photograph by E. E. Kleinschmidt

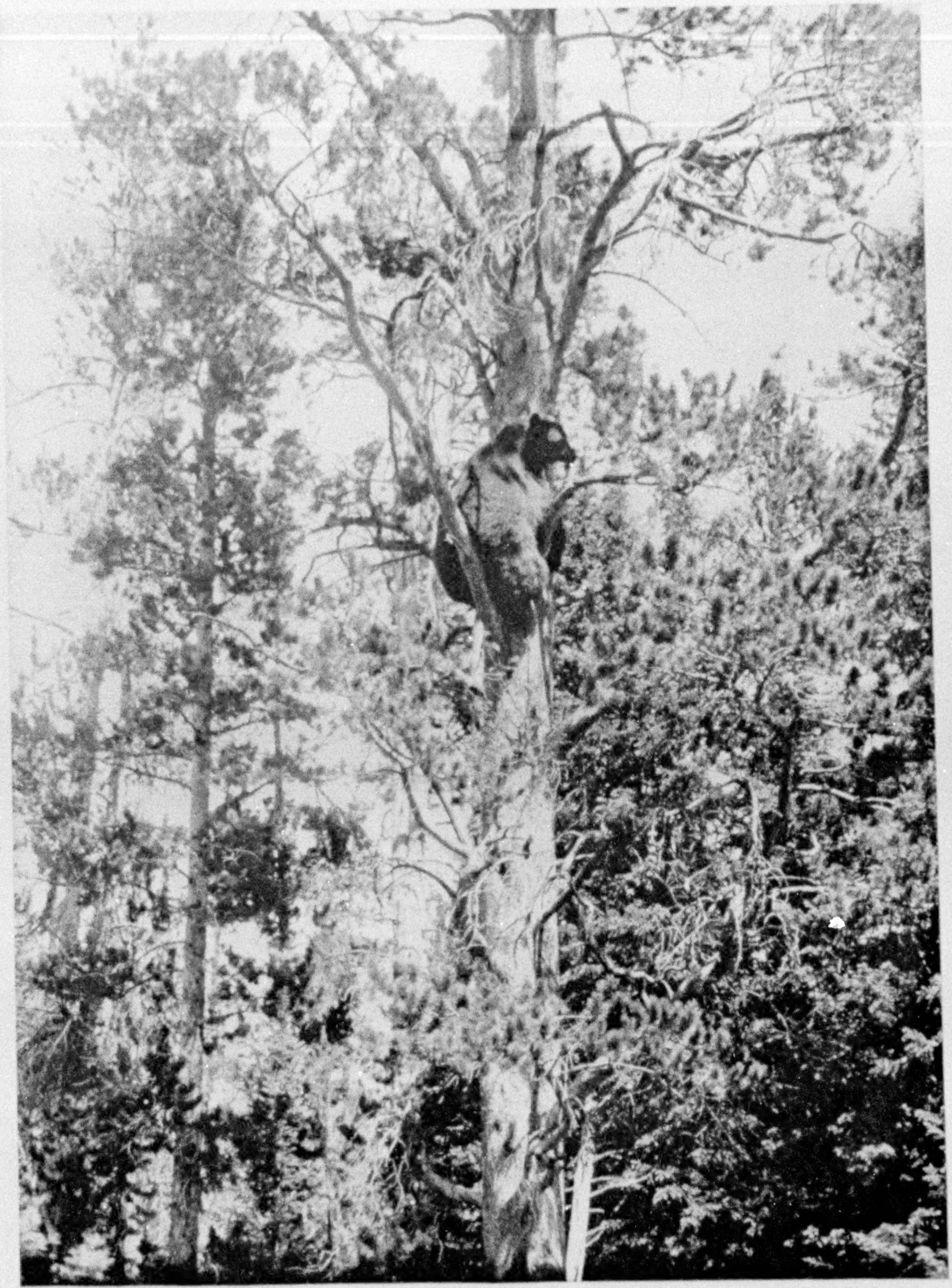
A WALRUS BATTLE FRONT: THOUGH FORMIDABLE LOOKING, WITH THEIR LONG TUSKS, THEY ASK ONLY TO BE LET ALONE

might recognize that distant white dots might be antelope and not buffalo bones or puff balls. I used to talk on this subject with men who were on the plains in the '60's and '70's, and all agreed that, so far as their judgment went, there were more antelope than buffalo. Often the buffalo were bunched up into thick herds and gave the impression of vast numbers. The antelope were scattered, and, except in winter, when I have seen herds of thousands, they were pretty evenly distributed over the prairie.

ANTELOPES EVERYWHERE

"I have certain memories of travel on the plains, when for the whole long day one would pass a continual succession of small bands of antelope, numbering from ten to fifty or sixty, those at a little distance paying no attention to the traveler, while those nearer at hand loped lazily and unconcernedly out of the way. In the year 1879, in certain valleys in North Park, Colorado, I saw wonderful congregations of antelope. As far as we could see in any direction, all over the basins, there were antelope in small or considerable groups. In one of these places I examined with care the trails made by them, for this was the only place where I ever saw deeply worn antelope trails, which suggested the buffalo trails of the plains."

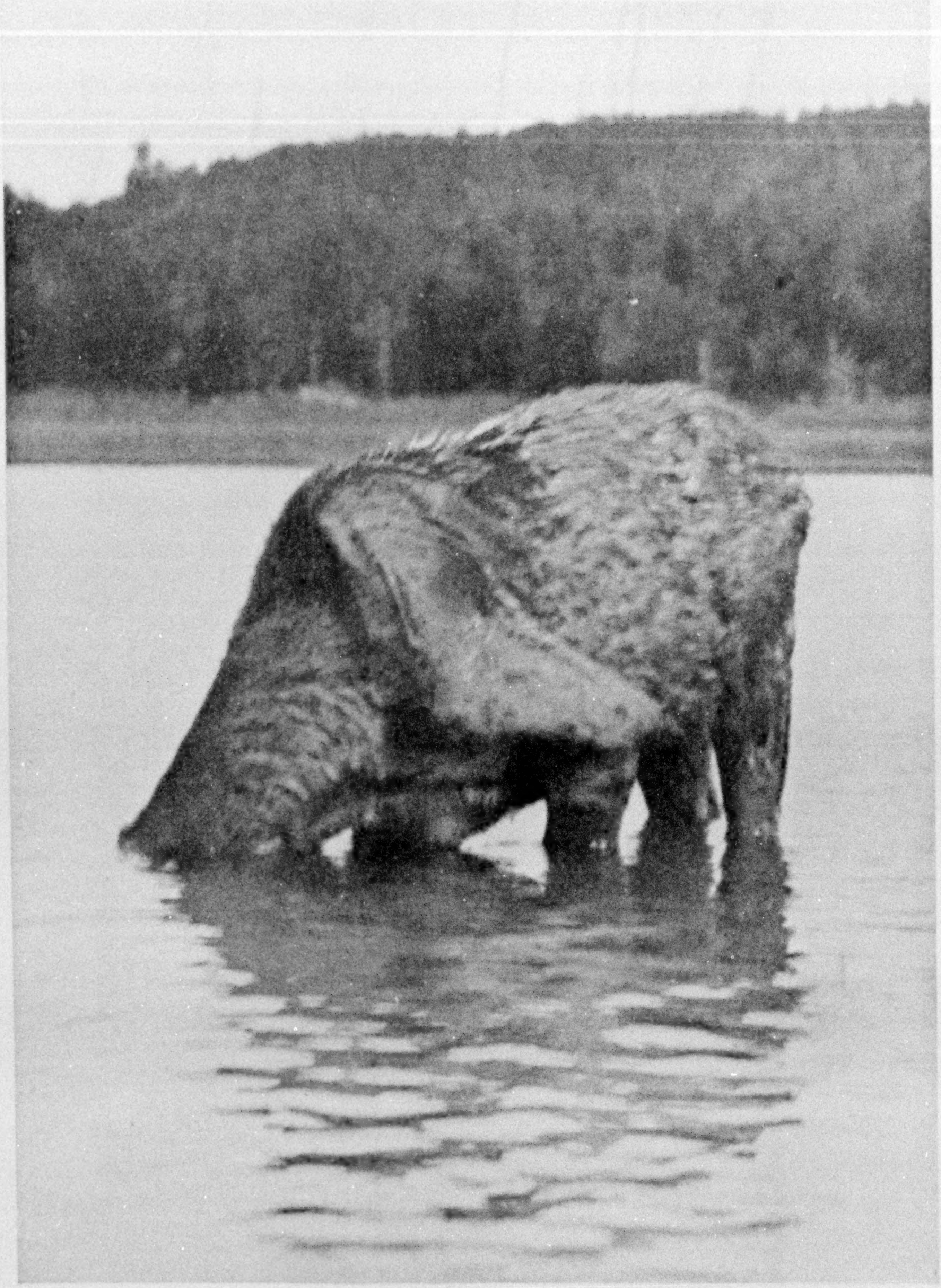
The wealth of animal life found by our forebears was one of the great natural resources of the New World. Although freely drawn upon from the first, the stock was but little depleted up to within a century. During the last one hundred years, however, the rapidly increasing occupation of the continent and other



Photograph by Albert Schlechten

A CINNAMON TREED: YELLOWSTONE NATIONAL PARK

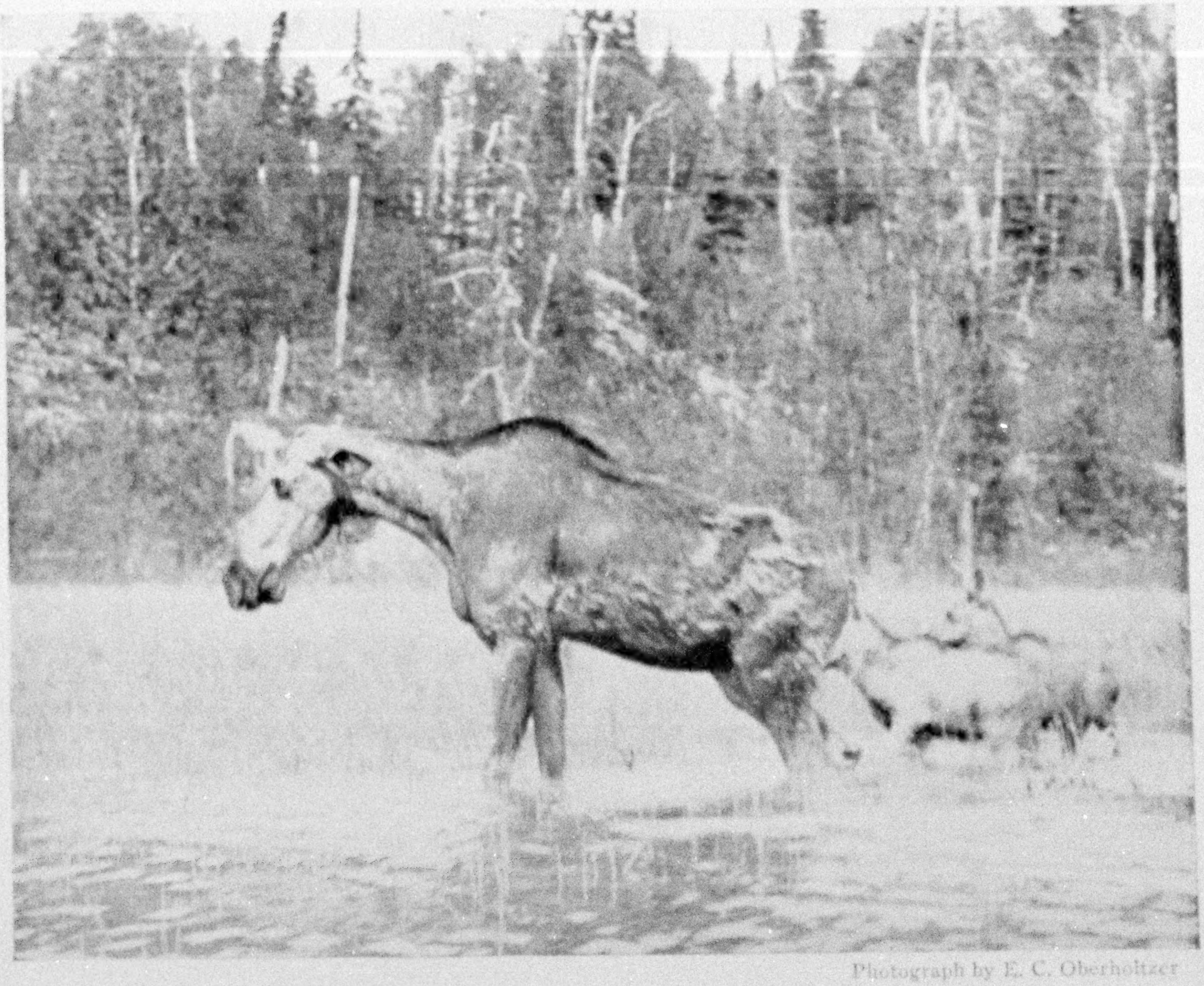
Bruin for the most part is an inoffensive beast, with an impelling curiosity and such a taste for sweet things that he can eat pounds of honey and lick his chops for more



Photograph by E. C. Oberholtzer

MOOSE FEEDING UNDER DIFFICULTIES

The moose likes the succulent water plants it finds at the bottom of lakes and sluggish streams, and often when reaching for them becomes completely submerged



Photograph by E. C. Oberholtzer

COW MOOSE WITH HER YOUNG

Notice the fold of skin at her neck resembling a bell

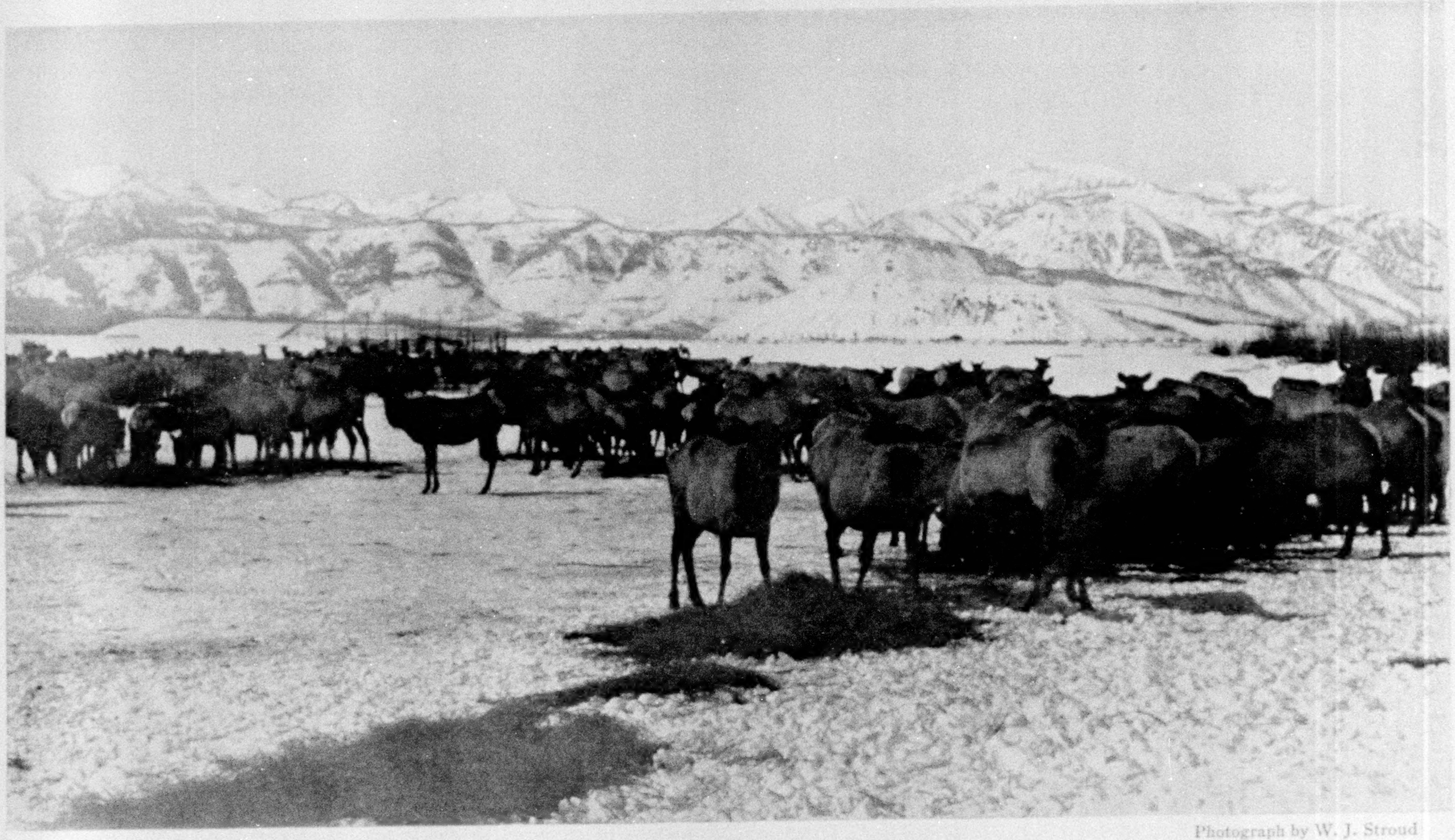
causes, together with a steadily increasing commercial demand for animal products, have had an appalling effect. The buffalo, elk, and antelope are reduced to a pitiful fraction of their former countless numbers.

WANTON WASTE OF WILD LIFE

Practically all other large game has alarmingly decreased, and its extermination has been partly stayed only by the recent enforcement of protective laws. It is quite true that the presence of wild buffalo, for instance, in any region occupied for farming and stock-raising purposes is incompatible with such use. Thus the extermination of the bison as a denizen of our western plains was inevitable. The destruction, however, of these noble game animals by millions for their hides only furnishes a notable example of the wanton wastefulness which has heretofore largely characterized the handling of our wild life.

A like disregard for the future has been shown in the pursuit of the sea mammals. The whaling and sealing industries are very ancient, extending back for a thousand years or more; but the greatest and most ruthless destruction of the whales and seals has come within the last century, especially through the use of steamships and bomb-guns. Without adequate international protection, there is grave danger that the most valuable of these sea mammals will be exterminated. The fur seal and the sea-elephant, once so abundant on the coast of southern California, are nearly or quite gone, and the sea otter of the North Pacific is dangerously near extinction.

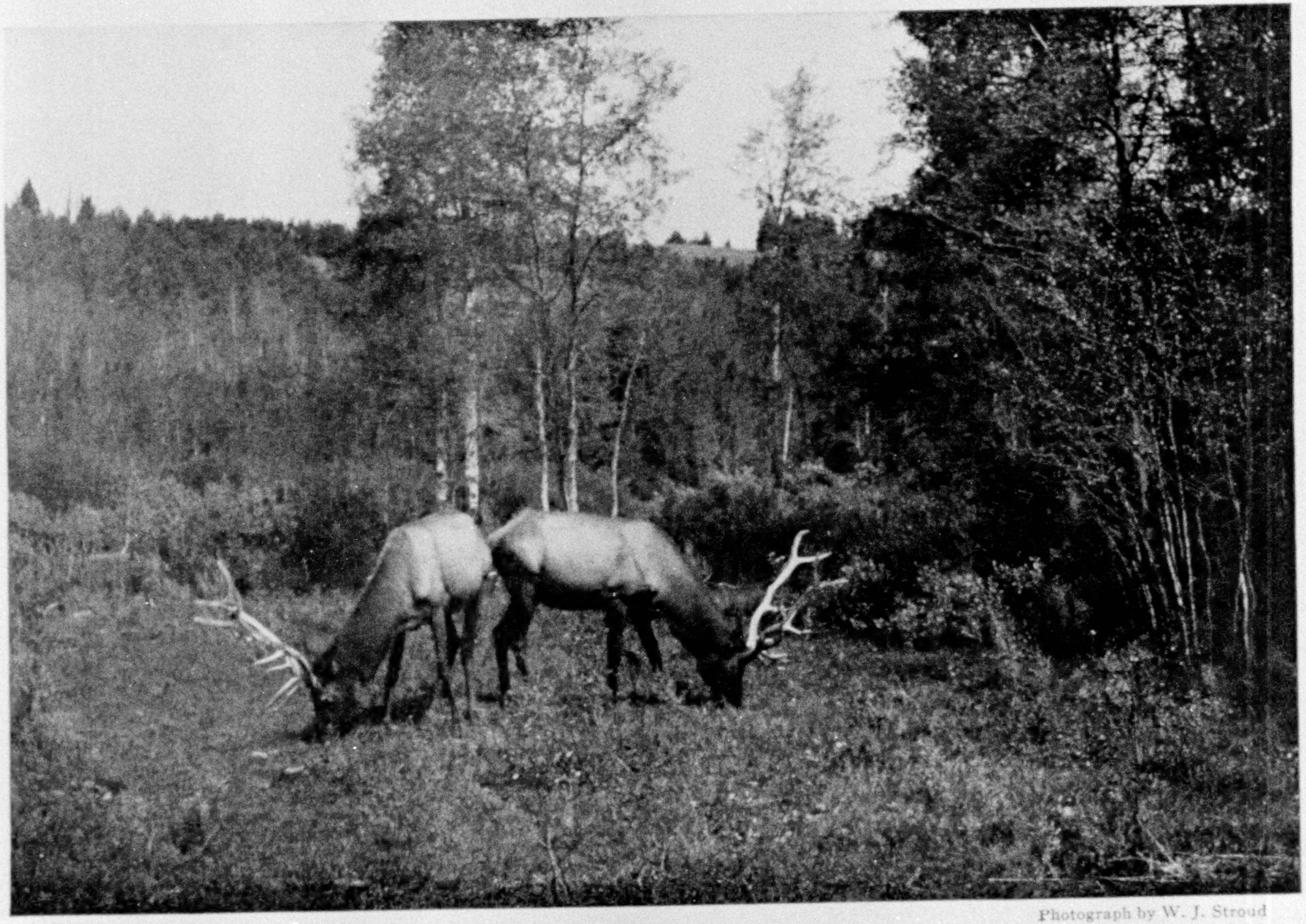
The recent great abundance of large land mammals in North America, both in individuals and species, is in striking contrast with their scarcity in South America, the difference evidently being due to the long isolation of the southern continent from other land-masses, whence it



Photograph by W. J. Stroud

ROCKY MOUNTAIN ELK

They can hold their own in the mountains in summer, but when the deep snows come they are compelled to go down into the valleys. Just before they leave the big bulls travel the mountains from one end to the other, driving old and young before them into the lower country. In case of a hard winter the elk are thin and weak, and then the dreaded wolf makes havoc among them, especially the little calves.

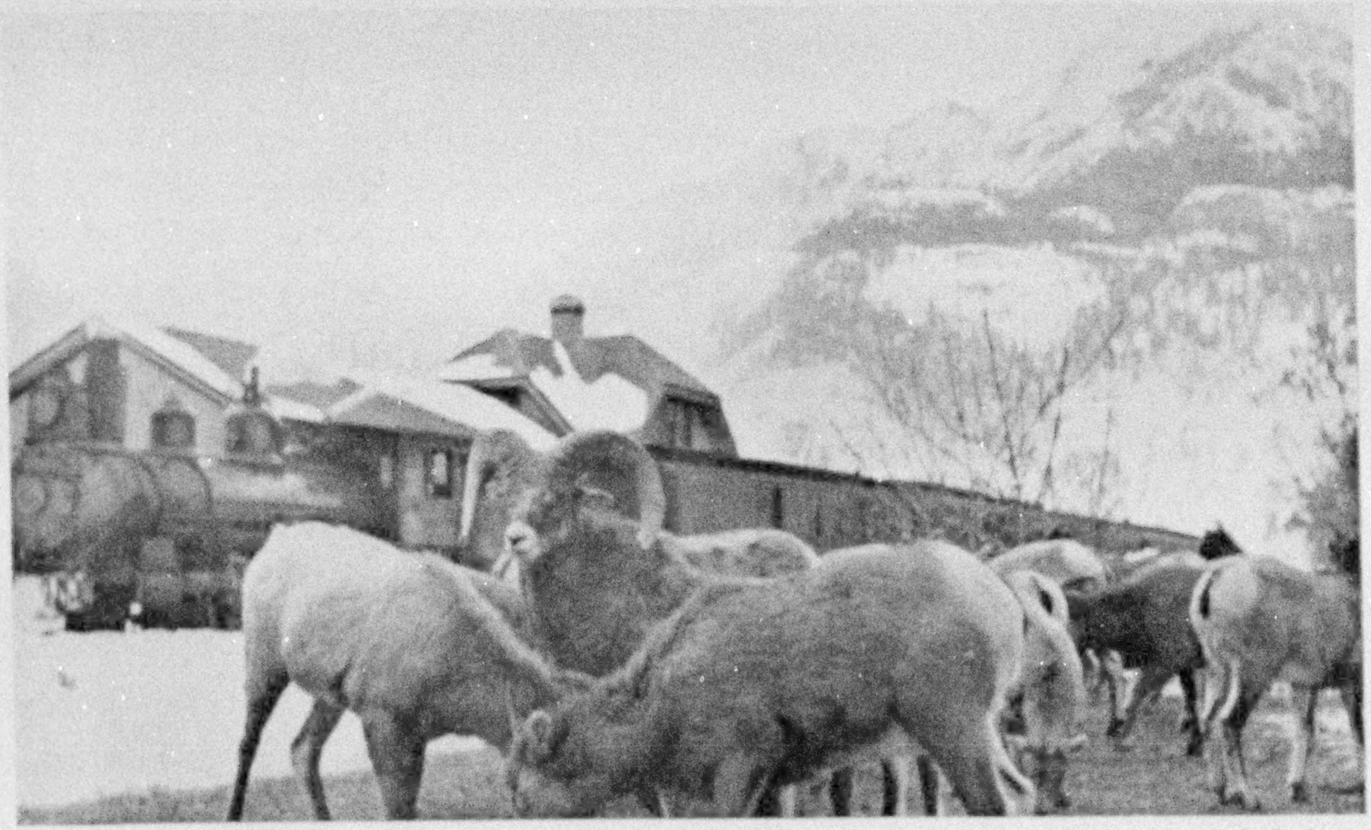


Photograph by W. J. Stroud

AN UNUSUAL ELK PICTURE

Photograph by Charles E. Johnson

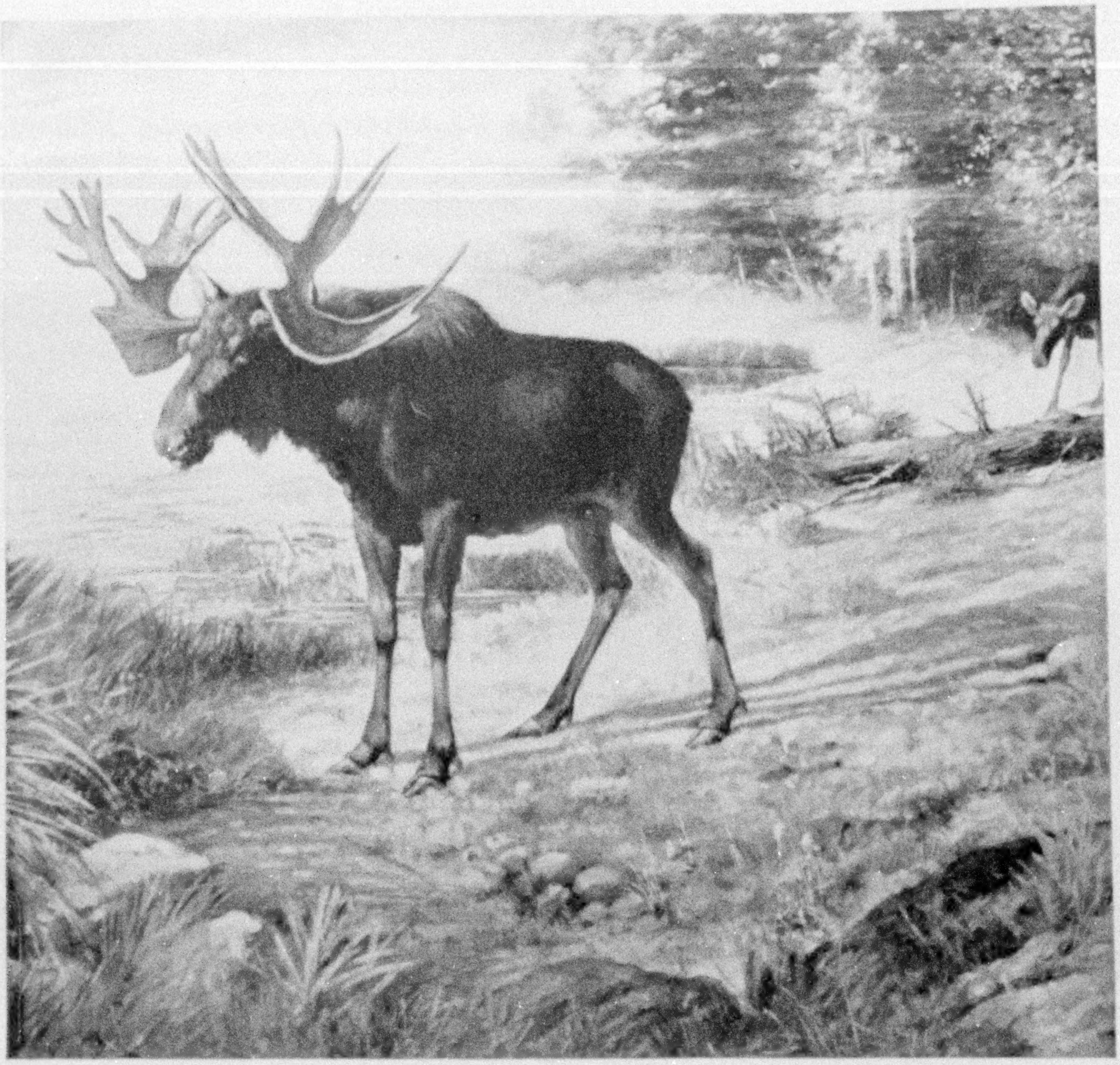
THE MOOSE IS A POWERFUL SWIMMER



Photograph by F. O. Seabury

PART OF A HERD OF SIXTY MOUNTAIN SHEEP

They are fed hay and salt daily at the Denver and Rio Grande Railway station at Ouray, Colorado. This picture was taken at a distance of about 10 to 15 feet from the wild animals, which grow quite tame under such friendly ministrations.



From a drawing by Charles R. Knight

A MOOSE THAT LIVED IN NEW JERSEY IN PLEISTOCENE TIMES: CROVALCES

A primitive moose-like form, a nearly perfect skeleton of which was found in southern Jersey some years ago. In size and general proportions the animal was like a modern moose, but the nose was less developed, and the horns were decidedly different in character.

might have been restocked after the loss of a formerly existing fauna.

SPECIES COME AND SPECIES GO

The differences in the geographic distribution of mammal life between North and South America and the relationships between our fauna and that of the Old World are parts of the latest chapter of a wonderful story running back through geologic ages. The former chapters are recorded in the fossil beds of all the continents. While only a good beginning has been made in deciphering these records, enough has been done by the fascinating researches of Marsh, Cope, Osborn, Scott, and others to prove that in all parts of the earth one fauna has succeeded another in marvelous procession.

It has been shown also that these changes in animal life, accompanied by equal changes in plant life, have been largely brought about by variations in climate and by the uplifting and depressing of continental land-masses above or below the sea. The potency of climatic influence on animal life is so great that even a fauna of large mammals will be practically destroyed over a great area by a long-continued change of a comparatively few degrees (probably less than ten degrees Fahrenheit) in the mean daily temperatures.

The distribution of both recent and

XUM

Photograph by Gus A. Swanson

THEIR LIVING LIES BENEATH THE SNOW

All nature loves kindness and trusts the gentle hand. Contrast these sheep, ready to fly at the slightest noise, with those in the picture on page 396, peacefully feeding in close proximity to a standing express train. Every one appreciates a good picture of a living animal more than the trophy of a dead one!

fossil mammals shows conclusively that numberless species have spread from their original homes across land bridges to remote unoccupied regions, where they have become isolated as the bridges disappeared beneath the waves of the sea.

VAST NATURAL MUSEUMS OF EXTINCT ANIMAL LIFE

For ages Asia appears to have served as a vast and fecund nursery for new mammals from which North Temperate and Arctic America have been supplied. The last and comparatively recent land bridge, across which came the ancestors of our moose, elk, caribou, prong-horned antelope, mountain goats, mountain sheep, musk-oxen, bears, and many other mammals, was in the far Northwest, where Bering Straits now form a shallow channel only 28 miles wide separating Siberia from Alaska.

Photograph by L. Peterson

INTRODUCING A LITTLE BLACK BEAR TO A LITTLE BROWN BEAR AT SEWARD, ALASKA

"Howdy-do! I ain't got a bit of use for you!"
"What do I care! You'd better back away, black bear!"

The fossil beds of the Great Plains and other parts of the West contain eloquent proofs of the richness and variety of mammal life on this continent at different periods in the past. Perhaps the most wonderful of all these ancient faunas was that revealed by the bones of birds and mammals which had been trapped in the asphalt pits recently discovered in the outskirts of Los Angeles, California. These bones show that prior to the arrival of the present fauna the plains of southern California swarmed with an astonishing wealth of strange birds and beasts (see page 401).

The most notable of these are saber-toothed tigers, lions much larger than those of Africa; giant wolves; several kinds of bears, including the huge cave bears, even larger than the gigantic brown bears of Alaska; large wild horses; camels; bison (unlike our buffalo); tiny antelope, the size of a fox; mastodons, mammoths with tusks 15 feet long; and giant ground sloths; in addition to many other species, large and small.

With these amazing mammals were equally strange birds, including, among numerous birds of prey, a giant vulturelike species (far larger than any condor), peacocks, and many others.

DID MAN LIVE THEN?

The geologically recent existence of this now vanished fauna is evidenced by the presence in the asphalt pits of bones of the gray fox, the mountain lion, and close relatives of the bobcat and coyote, as well as the condor, which still frequent that region, and thus link the past with the present. The only traces of the ancient vegetation discovered in these asphalt pits are a pine and two species of juniper, which are members of the existing flora.

There is reason for believing that primitive man occupied California and other parts of the West during at least the latter part of the period when the fauna of the asphalt pits still flourished. Dr. C. Hart Merriam informs me that the folk-lore of the locally restricted California Indians contains detailed descriptions of a beast which is unmistakably a bison, probably the bison of the asphalt pits.

The discovery in these pits of the bones of a gigantic vulturelike bird of prey of far greater size than the condor is even more startling, since the folk-lore of the Eskimos and Indians of most of the tribes from Bering Straits to California and the Rocky Mountain region abound in tales of the "thunder-bird"—a gigantic bird of prey like a mighty eagle, capable of carrying away people in its talons. Two such coincidences suggest the possibility that the accounts of the bison and the "thunder-bird" are really based on the originals of the asphalt beds and have been passed down in legendary history through many thousands of years.

CAMELS AND HORSES ORIGINATED IN NORTH AMERICA

Among other marvels our fossil beds reveal the fact that both camels and horses originated in North America. The remains of many widely different species of both animals have been found

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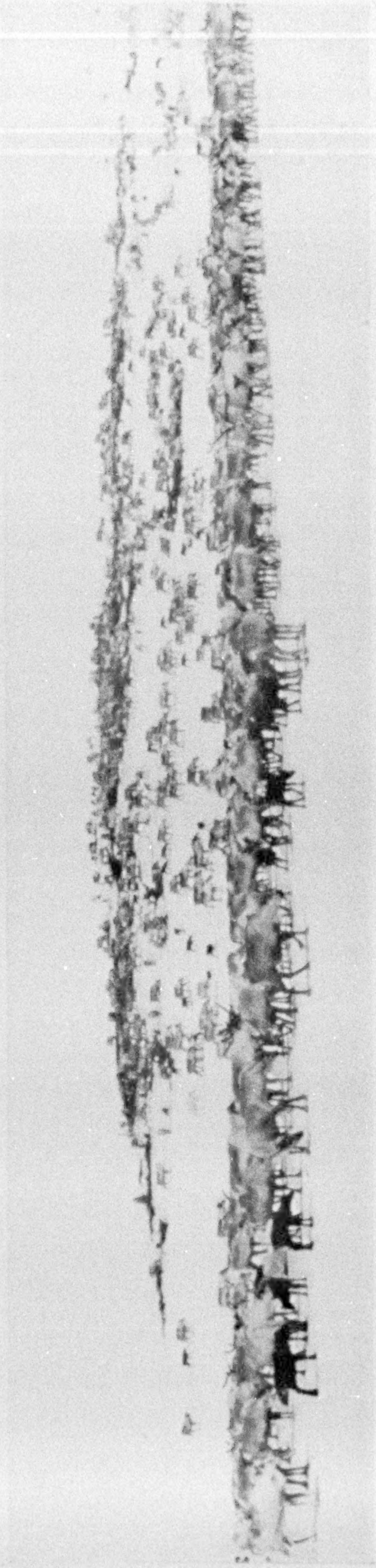


Photograph by Carl J. Lomen

A REINDEER HERD AT CAPE PRINCE OF WALES, ALASKA: MANY FAWNS ARE TO BE SEEN IN THE HERD, AS THIS PICTURE WAS TAKEN SHORTLY AFTER THE FAWNING SEASON

in numerous localities extending from coast to coast in the United States. Camels and horses, with many species of antelope closely related to still existing forms in Africa, abounded over a large part of this country up to the end of the geological age immediately preceding the present era.

Then through imperfectly understood changes of environment a tremendous mortality among the wild life took place and destroyed practically all of the splendid large mammals, which, however, have left their records in the asphalt pits of California and other fossil beds throughout the country. This original fauna was followed by an influx of other species which made up the fauna when America was discovered.

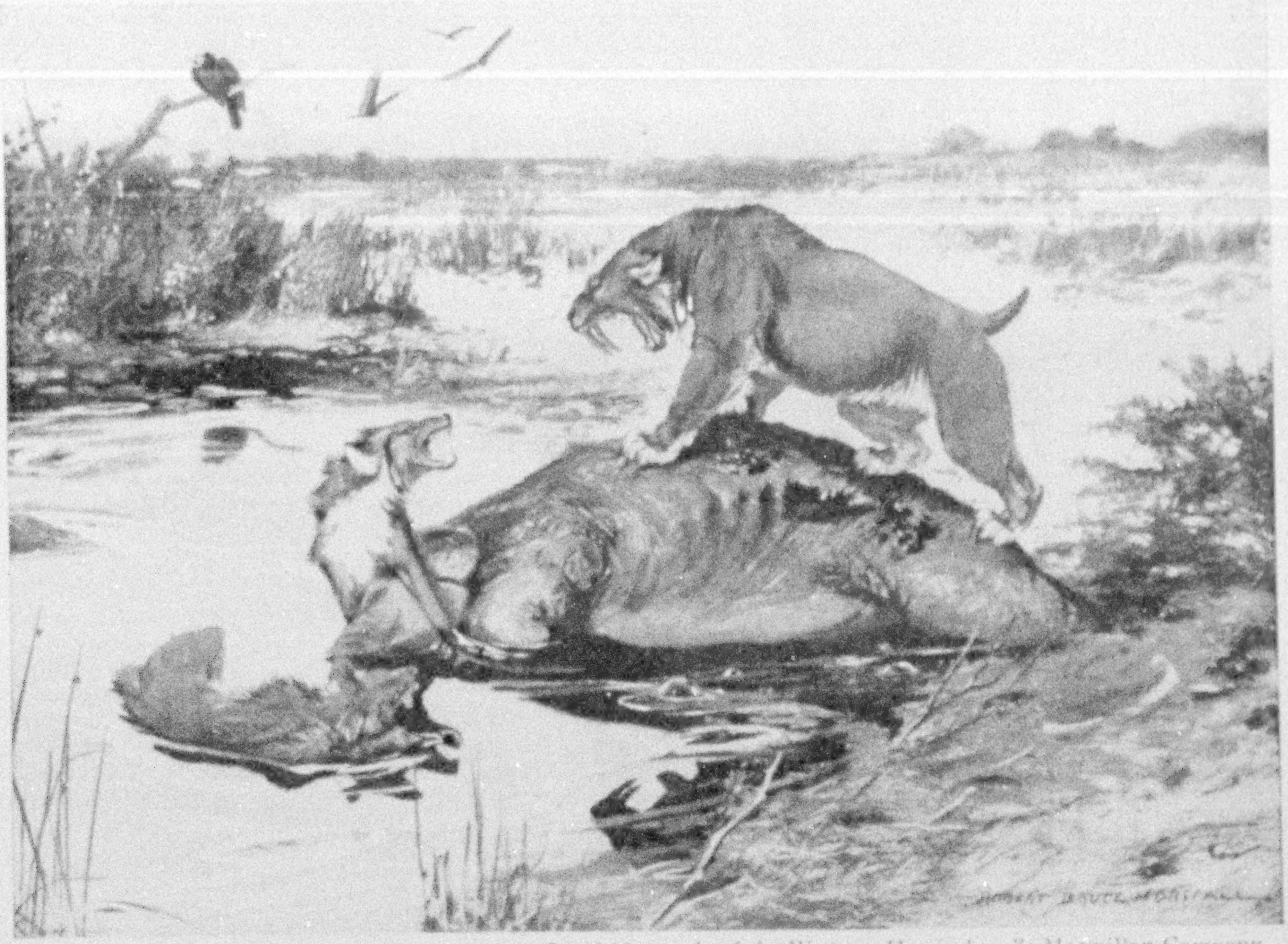
At the time of its discovery by Columbus this continent had only one domesticated mammal—the dog. In most instances the ancestors of the Indian dogs appear to have been the native coyotes or gray wolves, but the descriptions of some dogs found by early explorers indicate very different and unknown ancestry. Unfortunately these strange dogs became extinct at an early period, and thus left unsolvable the riddle of their origin.

Before the discovery of America the people of the Old World had domesticated cattle, horses, pigs, sheep, goats, dogs, and cats; but none of these domestic animals, except the dog, existed in America until brought from Europe by the invaders of the New World.

The wonderful fauna of the asphalt pits had vanished long before America was first colonized by white men, and had been replaced by another mainly from the Old World, less varied in character, but enormously abundant in individuals. Although so many North American mammals were derived from Asia, some came from South America, while others, as the raccoons, originated here.

FEWER LARGE MAMMALS IN THE TROPICS

It is notable that the fossil beds which prove the existence of an extraordinary abundance of large mammals in North America at various periods in the past, as well as the enormous aggregation of mammalian life which occupied this continent, both on land and at sea, at the time of its discovery, were confined to the Temperate and Arctic Zones. It is popu-



From Scott's "History of the Land Mammals of the Western Hemisphere": Macmillan Company

THIS REPRESENTS A SCENE AT THE CALIFORNIA ASPHALT PITS, WITH A MIRED ELEPHANT, TWO GIANT WOLVES, AND A SABER-TOOTHED TIGER (SEE PAGE 399)

larly believed that the tropics possess an exuberance of life beyond that of other climes, yet in no tropic lands or seas, except in parts of Africa and southern Asia, has there been developed such an abundance of large mammal life as these northern latitudes have repeatedly known.

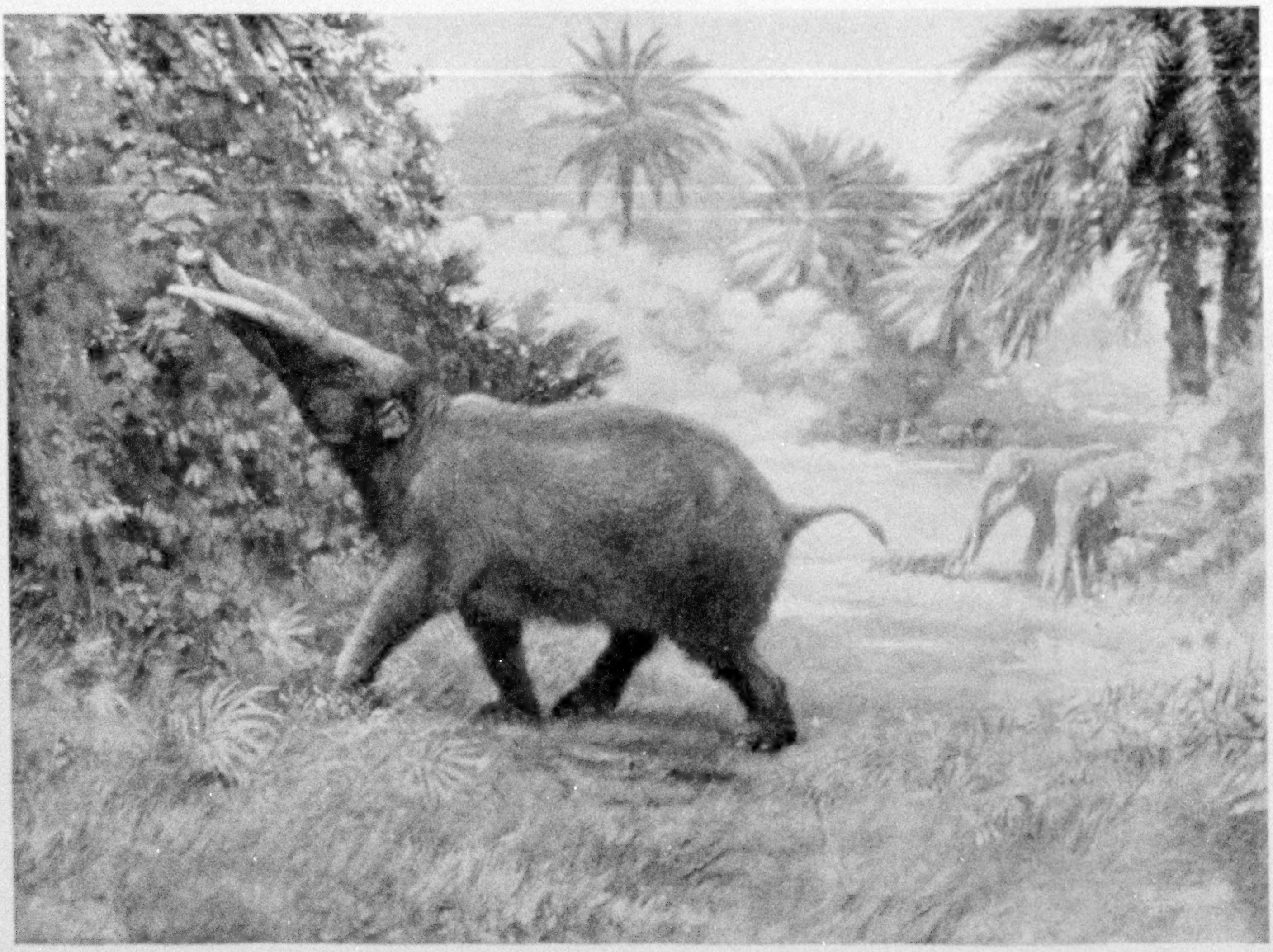
In temperate and arctic lands such numbers of large mammals could exist only where the vegetation not only sufficed for summer needs, but retained its nourishing qualities through the winter. In the sea the vast numbers of seals, sea-lions, walruses, and whales of many kinds could be maintained only by a limitless profusion of fishes and other marine life.

From the earliest appearance of mammals on the globe to comparatively recent times one mammalian fauna has succeeded another in the regular sequence of evolution, man appearing late on the scene and being subject to the same natural influences as his mammalian kindred. During the last few centuries, however, through the development of agriculture, the invention of new methods of transportation, and of modern firearms, so-called civilized man has spread over and now dominates most parts of the earth.

As a result, aboriginal man and the large mammals of continental areas have been, or are being, swept away and replaced by civilized man and his domestic animals. Orderly evolution of the marvelously varied mammal life in a state of nature is thus being brought to an abrupt end. Henceforth fossil beds containing deposits of mammals caught in sink-holes, and formed by river and other floods in subarctic, temperate, and tropical parts of the earth, will contain more and more exclusively the bones of man and his domesticated horses, cattle, and sheep

DESTROYING THE IRRESTORABLE

The splendid mammals which possessed the earth until man interfered were the ultimate product of Nature working through the ages that have elapsed since the dawn of life. All of them show myriads of exquisite adaptations to their environment in color, form, organs, and habits. The wanton destruction of any



From a drawing by Charles R. Knight

A PRIMITIVE FOUR-TUSKED ELEPHANT, STANDING ABOUT SIX FEET AT THE SHOULDER, THAT LIVED AGES AGO IN THE UNITED STATES (TRICOPHODON MIOCENE)

of these species thus deprives the world of a marvelous organism which no human power can ever restore.

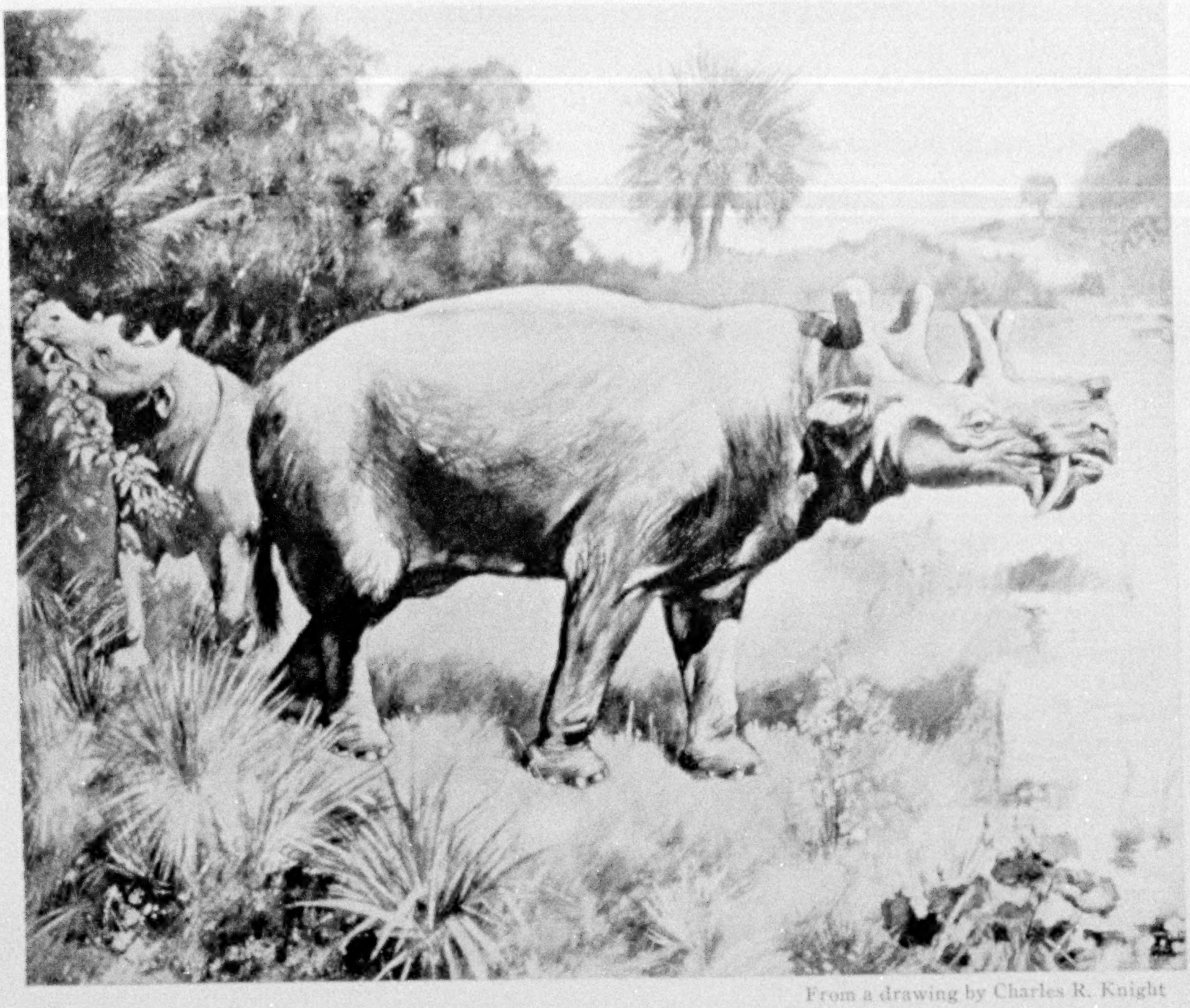
Fortunately, although it is too late to save many notable animals, the leading nations of the world are rapidly awakening to a proper appreciation of the value and significance of wild life. As a consequence, while the superb herds of game on the limitless plains will vanish, sportsmen and nature lovers, aided by those who appreciate the practical value of wild life as an asset, may work successfully to provide that the wild places shall not be left wholly untenanted.

Although Americans have been notably wasteful of wild life, even to the extermination of numerous species of birds and mammals, yet they are now leading the world in efforts to conserve what is left of the original fauna. No civilized people, with the exception of the South African Boers, have been such a nation of hunters as those of the United States. Most hunters have a keen appreciation of nature, and American sportsmen as a class have become ardent supporters of a nation-wide movement for the conservation of wild life.

SAVING OUR WILD LIFE

Several strong national organizations are doing great service in forwarding the conservation of wild life, as the National Geographic Society, the National Association of Audubon Societies, American Bison Society, Boone and Crockett Club, New York Zoölogical Society, American Game Protective and Propagation Association, Permanent Wild Life Protective Fund, and others. In addition, a large number of unofficial State organizations have been formed to assist in this work.

Through the authorization by Congress, the Federal Government is actively engaged in efforts for the protection and increase of our native birds and mammals. This work is done mainly through the Bureau of Biological Survey of the U. S. Department of Agriculture, which is in charge of the several Federal large-game



From a drawing by Charles R. Knight

A GROTESQUE CREATURE THAT ONCE LIVED IN THE UNITED STATES (UERTATHERIUM EOCENE, MIDDLE WYOMING)

It had six horns on the head and, in some species, two long canine teeth projecting downward from the upper jaw. The feet were somewhat like those of an elephant, but the skull and teeth resemble nothing on earth today.

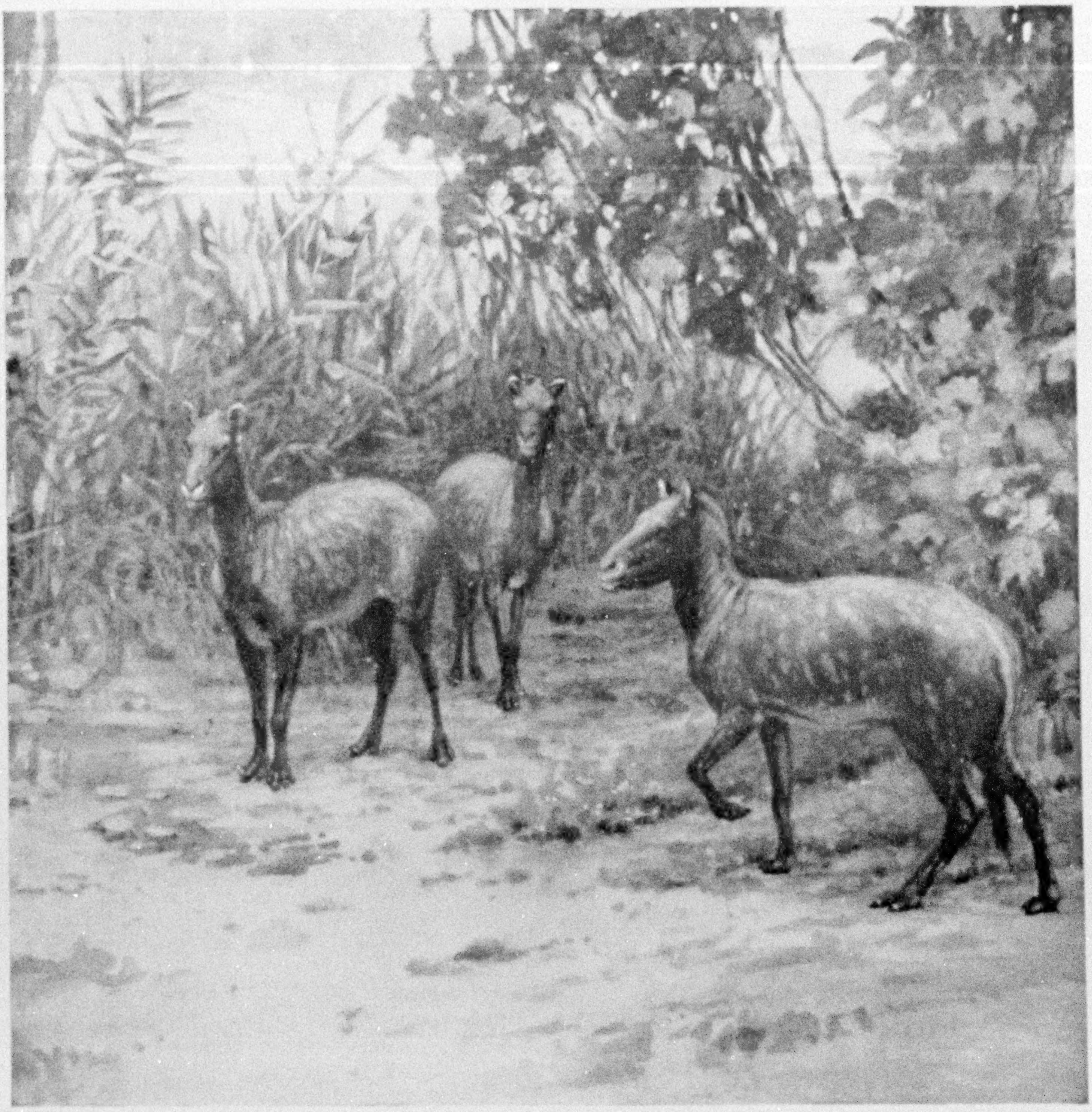
preserves and nearly seventy bird reservations.

On the large-game preserves are herds of buffalo, elk, deer, and antelope. The Yellowstone National Park, under the Department of the Interior, is one of the most wonderfully stocked game preserves in the world. In this beautiful tract of forest, lakes, rivers, and mountains live many moose, elk, deer, antelope, mountain sheep, black and grizzly bears, wolves, coyotes, mountain lions, and lynxes.

Practically all of the States have game and fish commissions in one form or another, with a warden service for the protection of game, and large numbers of State game preserves have been established. The increasing occupation of the country, the opening up of wild places, and the destruction of forests are rapidly restricting available haunts for game. This renders particularly opportune the present and increasing wide-spread interest in the welfare of the habitants of the wilderness.

The national forests offer an unrivaled opportunity for the protection and increase of game along broad and effective lines. At present the title to game mammals is vested in the States, among which great differences in protective laws and their administration in many cases jeopardize the future game supply.

If a coöperative working arrangement could be effected between the States and the Department of Agriculture, whereby the Department would have supervision and control over the game on the national forests, so far as concerns its protection



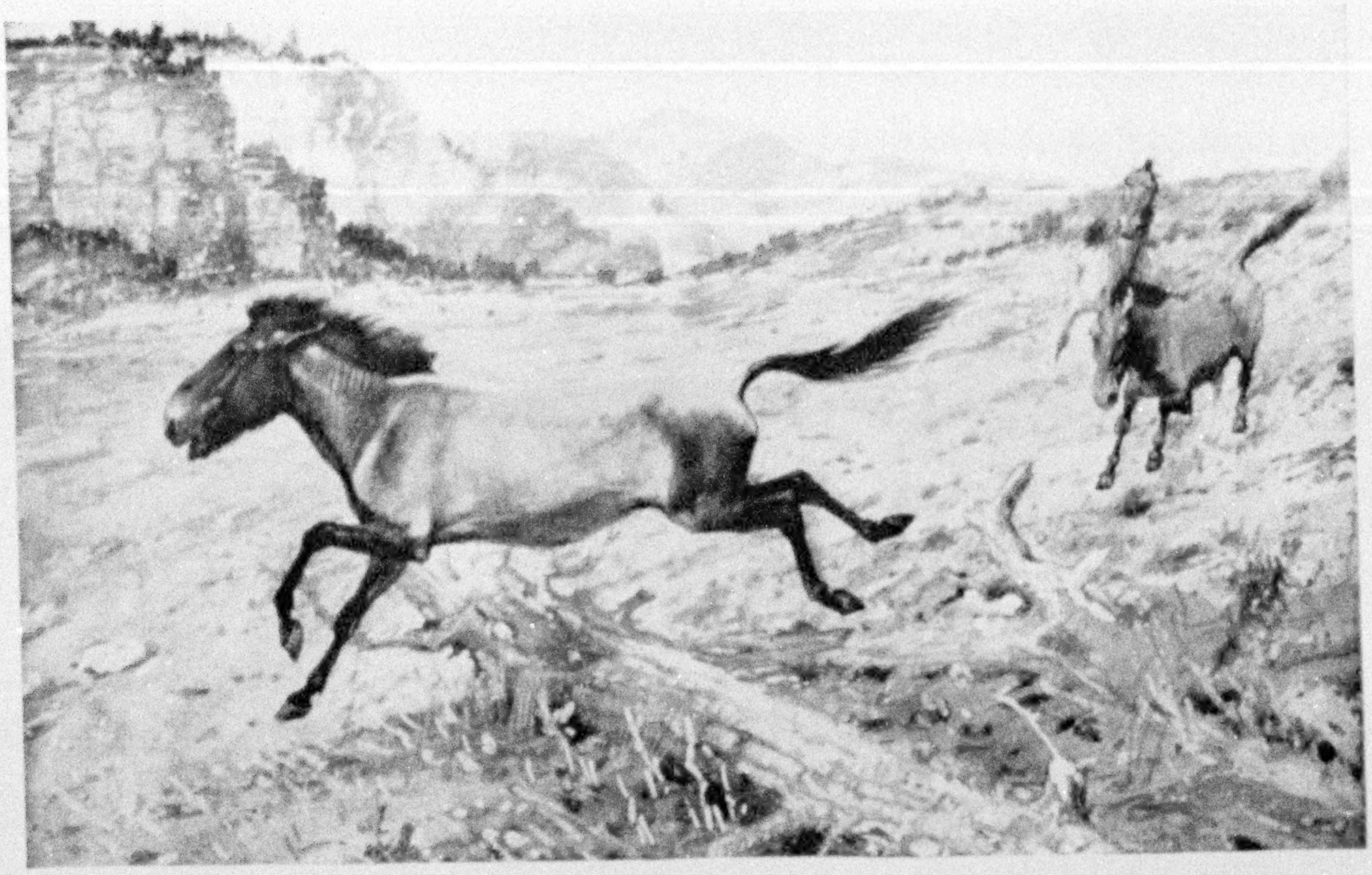
From a drawing by Charles R. Knight

THE PRIMITIVE FOUR-TOED HORSE (EOHIPPUS, LOWER EOCENE, WYOMING)

The so-called four-toed horse, a little creature some 12 inches in height at the shoulder, having four well-defined hoofs on the front foot and three on the hind foot. The animal is not a true horse, but was undoubtedly an ancestor (more or less direct) of the modern form. It must have been a very speedy type, which contributed greatly to the preservation of the species in an age when (so far as we know) the carnivores were rather slow and clumsy.

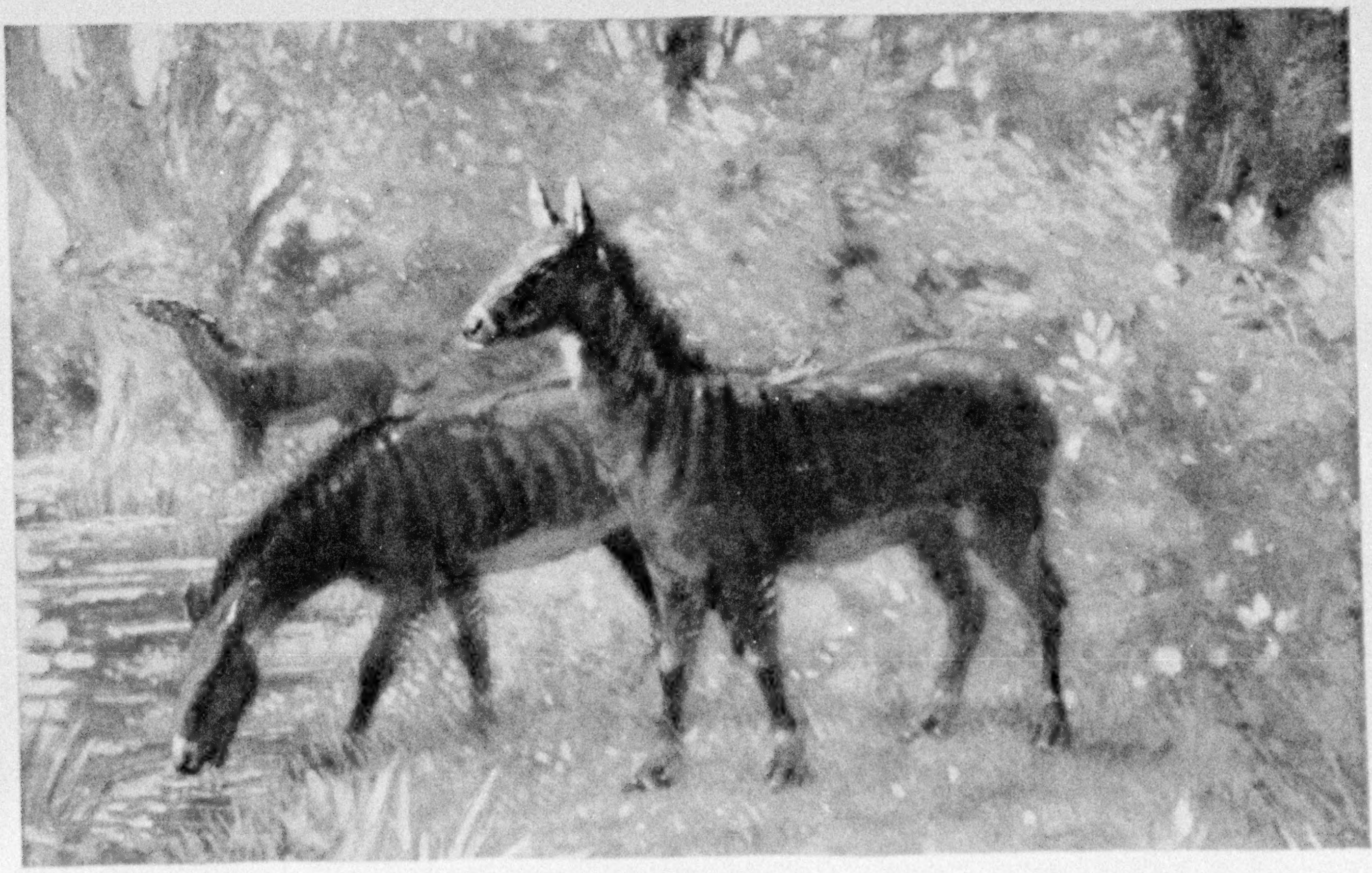
and the designation of hunting areas, varying the quantity of game to be taken from definite areas in accordance with its abundance from season to season, while the States would control open seasons for shooting, the issuance of hunting licenses, and similar local matters, the future welfare of large game in the Western States would be assured.

Under such an arrangement the game supply would be handled on business principles. When game becomes scarce in any restricted area, hunting could be suspended until the supply becomes renewed, while increased hunting could be allowed in areas where there is sufficient game to warrant it. In brief, big game could be handled by the common-sense methods now used so effectively in the stock industry on the open range. At present the lack of a definite general policy to safeguard our game supply and the resulting danger to our splendid native animals are deplorably in evidence.



A TRUE HORSE WHICH WAS FOUND IN THE FOSSIL BEDS OF TEXAS: PLEISTOCENE

It is interesting to note that this country was possessed of several species of wild horses, but these died out long before the advent of the Indian on this continent. The present wild horses of our western plains are merely stragglers from the herds brought over by the Spaniards and other settlers. When Columbus discovered America there were no horses on the continent, though in North America horses and camels originated (see text, page 399).



From drawings by Charles R. Knight

THE FOREST HORSE OF NORTH AMERICA (HYPOHIPPOS MIOCENE)

This animal is supposed to have inhabited heavy undergrowth. It was somewhat off the true horse ancestry and had three rather stout toes on both the fore and hind feet.

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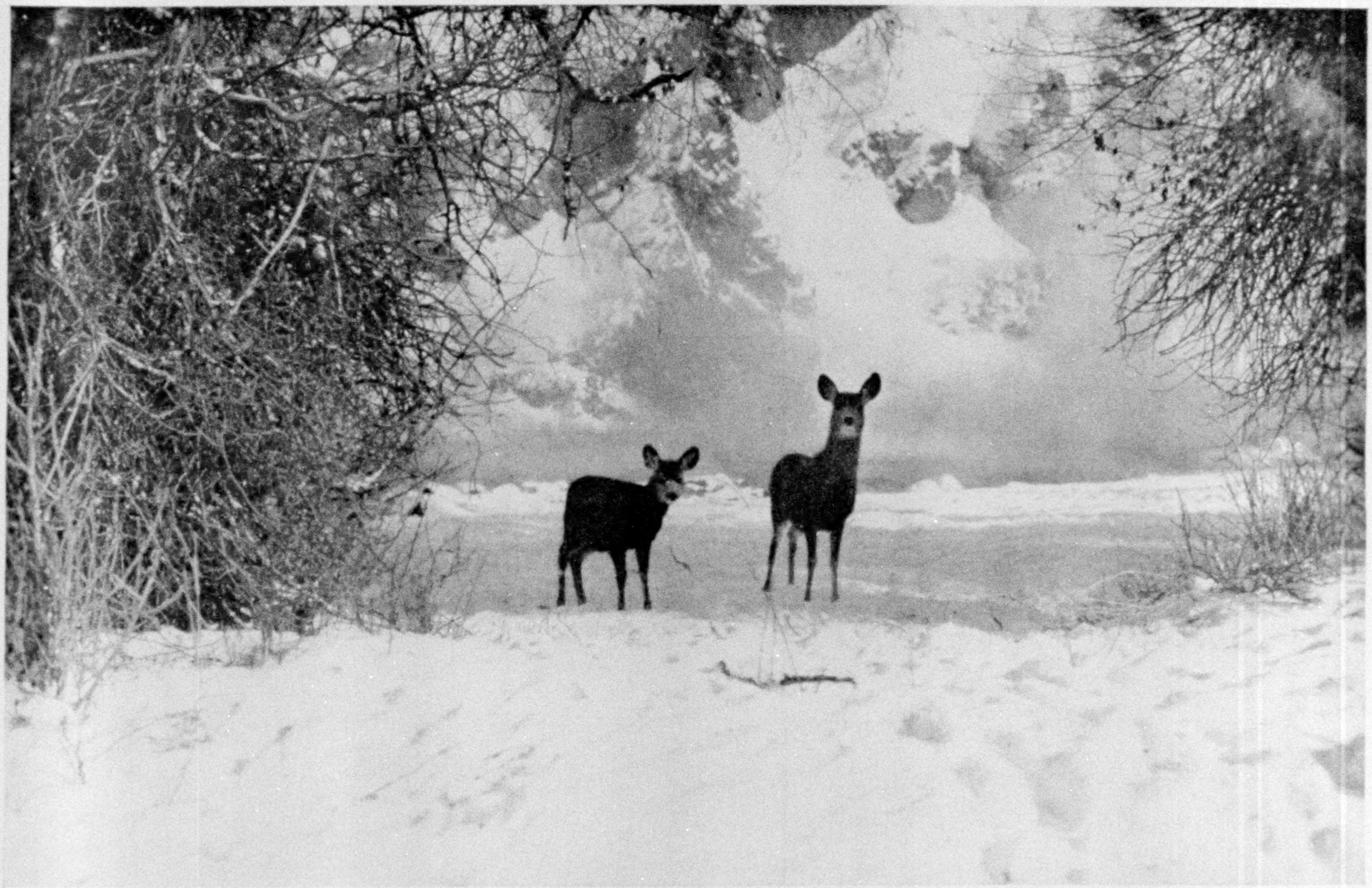

Photograph by Gus A. Swanson

A MONTANA DOE AND FAWN

Observers of those times believed that at the beginning of the last century there were more deer and antelope in the United States than there were buffaloes. If that be true, they were probably more numerous than any domestic animal we have today.

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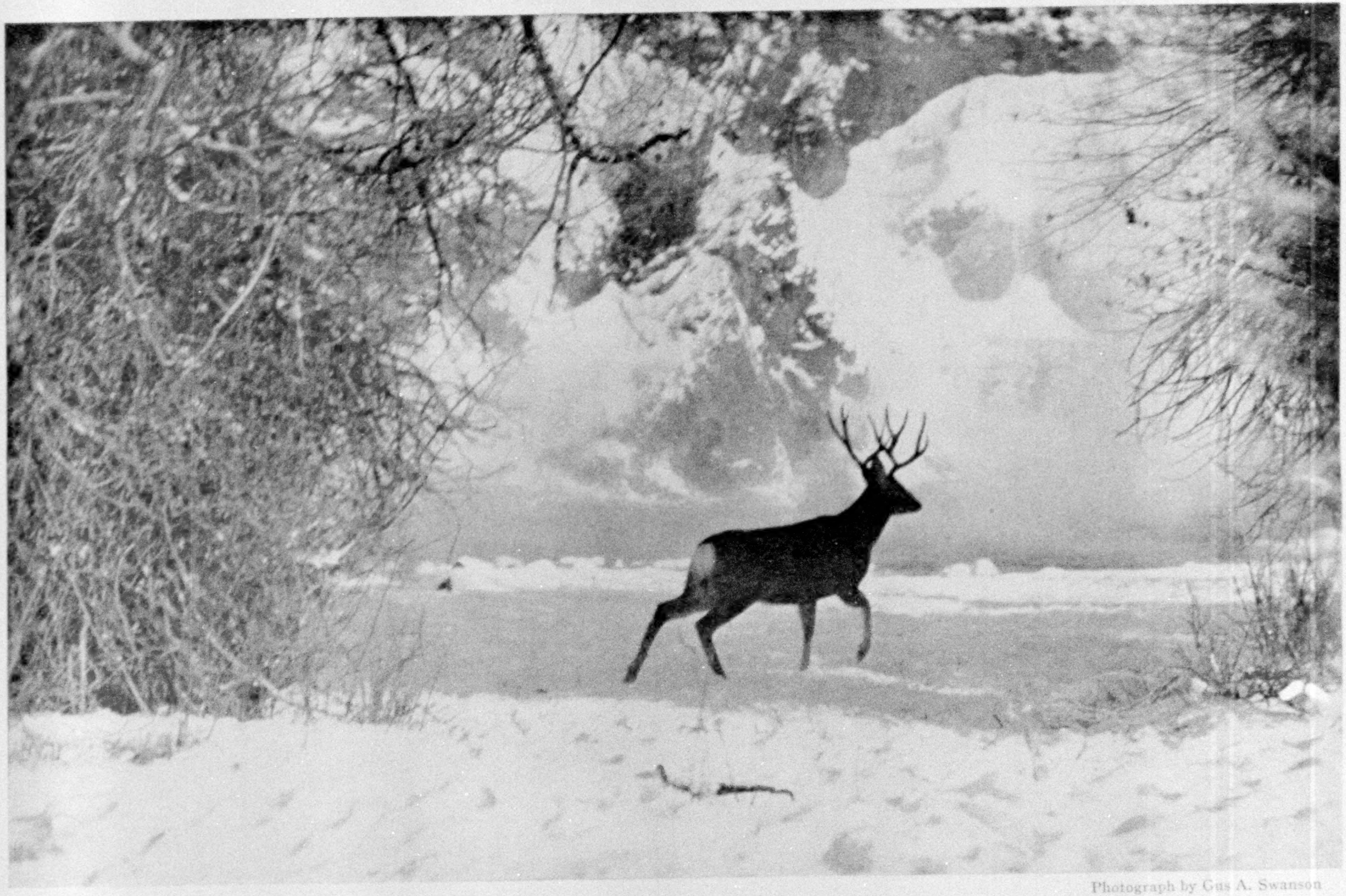

Photograph by Gus A. Swanson

THE SPIRIT OF THE WILD

Timorous as a gazelle in the open, brave as a lion when forced to fight, with nerves as quick as lightning and sinews as hard as steel, these denizens of the deep wood match the wind for speed, are unsurpassed for endurance, and yield place to no other species in graceful beauty.

OPOSSUM, VIRGINIA OPOSSUM (**Didelphis virginiana** and its subspecies)

The opossums are the American representatives of the ancient order of Marsupials—a wonderfully varied group of mammals now limited to America and Australasia. Throughout the order the young are born in an embryonic condition and are transferred to teats located in an external pocket or pouch in the skin of the abdomen, where they complete their development. The kangaroos are among the most striking members of this group.

Numerous species of opossums are known, all peculiar to America and distributed from the eastern United States to Patagonia. The Virginia opossum, the largest of all the species, is characterized by its coarse hair, pig-like snout, naked ears, and long, hairless, prehensile tail. Its toes are long, slender, and so widely spread that its footprints on the muddy border of a stream or in a dusty trail show every toe distinctly, as in a bird track, and are unmistakably different from those of any other mammal.

This is the only species of opossum occurring in the United States, where it occupies all the wooded eastern parts from eastern New York, southern Wisconsin, and eastern Nebraska south to the Gulf coast and into the tropics. It has recently been introduced in central California. Although scarce in the northern parts of its range, it is abundant and well known in the warmer Southern States.

These animals love the vicinity of water, and are most numerous in and about swamps or other wet lowlands and along bottom-lands bordering streams. They have their dens in hollow trees, in holes under the roots of trees, or in similar openings where they may hide away by day. Their food consists of almost everything, animal or vegetable, that is edible, including chickens, which they capture in nocturnal raids.

The Virginia opossums have from 5 to 14 young, which at first are formless, naked little objects, so firmly attached to the teats in the mother's pouch that they can not be shaken loose. Later, when they attain a coating of hair, they are miniature replicas of the adults, but continue to occupy the pouch until the swarming family becomes too large for it. The free toes of opossums are used like hands for grasping, and the young cling firmly to the fur of their mother while being carried about in her wanderings.

They are rather slow-moving, stupid animals, which seek safety by their retiring nocturnal habits and by non-resistance when overtaken by an enemy. This last trait gave origin to the familiar term "playing possum," and is illustrated by their habit of dropping limp and apparently lifeless when attacked. Despite this apparent lack of stamina, their vitality is extraordinary, rendering them difficult to kill.

While hunting at daybreak, I once encountered an unusually large old male opossum on his way home from a night in the forest. When we met, he immediately stopped and stood with hanging head and tail and half-closed eyes. I walked up and, after watching him for several minutes without seeing the slightest movement, put my foot against his side and gave a slight push. He promptly fell flat and lay limp and apparently dead. I then raised him and tried to put him on his feet again, but his legs would no longer support him, and I failed in other tests to obtain the slightest sign of life.

The opossum has always been a favorite game animal in the Southern States, and figures largely in the songs and folk-lore of the southern negroes. In addition, its remarkable peculiarities have excited so much popular interest that it has become one of the most widely known of American animals.

RACCOON (**Procyon lotor** and its subspecies)

Few American wild animals are more widely known or excite more popular interest than the raccoon. It is a short, heavily built animal with a club-shaped tail, and with hind feet that rest flat on the ground, like those of a bear, and make tracks that have a curious resemblance to those of a very small child. Its front toes are long and well separated, thus permitting the use of the front feet with almost the facility of a monkey's hands.

Raccoons occupy most of the wooded parts of North America from the southern border of Canada to Panama, with the exception of the higher mountain ranges. In the United States they are most plentiful in the Southeastern and Gulf States and on the Pacific coast. Under the varying climatic conditions of their great range a number of geographic races have developed, all of which have a close general resemblance in habits and appearance.

They everywhere seek the wooded shores of streams and lakes and the bordering lowland forests and are expert tree-climbers, commonly having their dens in hollow trees, often in cavities high above the ground. In such retreats they have annually from four to six young, which continue to frequent this retreat until well grown, thus accounting for the numbers often found in the same cavity. Although tree-frequenting animals, the greater part of their activities is confined to the ground, especially along the margins of water-courses. While almost wholly nocturnal in habits, they are occasionally encountered abroad during the day.

Their diet is extraordinarily varied, and includes fresh-water clams, crawfish, frogs, turtles, birds and their eggs, poultry, nuts, fruits, and green corn. When near water they have a curious and unique habit of washing their food before eating it. Their fondness for green corn leads them into frequent danger, for when bottom-land cornfields tempt them away from their usual haunts raccoon hunting with dogs at night becomes an especially favored sport.

Raccoons are extraordinarily intelligent animals and make interesting and amusing pets.

During captivity their restless intelligence is shown by the curiosity with which they carefully examine every strange object. They are particularly attracted by anything bright or shining, and a piece of tin fastened to the pan of a trap serves as a successful lure in trapping them.

They patrol the border of streams and lakes so persistently that where they are common they sometimes make well-trodden little trails, and many opened mussel shells or other signs of their feasts may be found on the tops of fallen logs or about stones projecting above the water. In the northern part of their range they hibernate during the coldest parts of the winter, but in the South are active throughout the year.

Raccoons began to figure in our frontier literature at an early date. "Coon-skin" caps, with the ringed tails hanging like plumes, made the favorite headgear of many pioneer hunters, and "coon skins" were a recognized article of barter at country stores. Now that the increasing occupation of the country is crowding out more and more of our wild life, it is a pleasure to note the persistence with which these characteristic and interesting animals continue to hold their own in so much of their original range.

CANADA LYNX (Lynx canadensis)

The lynxes are long-legged, short-bodied cats, with tufted ears and a short "bobbed" tail. They are distributed from the northern limit of trees south into the Temperate Zone throughout most of the northern part of both Old and New Worlds. In North America there are two types—the smaller animal, southern in distribution, and the larger, or Canada lynx, limited to the north, where its range extends from the northern limit of trees south to the northern border of the United States. It once occupied all the mountains of New England and south in the Alleghenies to Pennsylvania. In the West it is still a habitant of the Rocky Mountains as far south as Colorado, and of the Sierra Nevada nearly to Mount Whitney.

The Canada lynx is notable for the beauty of its head, one of the most striking among all our carnivores. This species is not only much larger than its southern neighbor, the bay lynx, but may also be distinguished from it by its long ear tips, thick legs, broad spreading feet, and the complete jet-black end of the tail. It is about 3 feet long and weighs from 15 to over 30 pounds. As befits an animal of the great northern forests, it has a long thick coat of fur, which gives it a remarkably fluffy appearance. Its feet in winter are heavily furred above and below and are so broad that they serve admirably for support in deep snow, through which it would otherwise have to wade laboriously.

This animal does not attack people, though popular belief often credits it with such action. It feeds mainly on such small prey as varying hares, mice, squirrels, foxes, and the grouse and other birds living in its domain; but on occasion it even kills animals as large as mountain sheep. One such feat was actually witnessed above timberline in winter on a spur of Mount McKinley. The lynx sprang from a ledge as the sheep passed below, and, holding on the sheep's neck and shoulders, it reached forward and by repeatedly biting put out its victim's eyes, thus reducing it to helplessness.

The chief food of the Canada lynx is the varying hare, which throughout the North periodically increases to the greatest abundance and holds its numbers for several years. During these periods the fur sales in the London market show that the number of lynx skins received increases proportionately with those of the hare. When an epizootic disease appears, as it does regularly, and almost exterminates the hares, there is an immediate and corresponding drop in the number of lynx skins sent to market. This evidences one of Nature's great tragedies, not only among the overabundant hares, but among the lynxes, for with the failure of their food supply over a vast area tens of thousands of them perish of starvation.

The Canada lynx has from two to five kittens, which are marked with dusky spots and short bands, indicating an ancestral relationship to animals similar to the ocelot, or tiger-cat, of the American tropics. The young usually keep with the mother for nearly a year. Such families no doubt form the hunting parties whose rabbit drives on the Yukon Islands were described to me by the fur traders and Indians of the Yukon Valley.

During sledge trips along the lower Yukon I often saw the distinctive broad, rounded tracks of lynxes, showing where they had wandered through the forests or crossed the wide, snow-covered river channel. Here and there, as the snow became very deep and soft, the tracks showed where a series of leaps had been made. Lynx trails commonly led from thicket to thicket where hares, grouse, or other game might occur. Canada lynxes appear to be rather stupid animals, for they are readily caught in traps, or even in snares, and, like most cats, make little effort to escape.

BOBCAT, OR BAY LYNX (Lynx ruffus and its subspecies)

The bay lynx, bobcat, or wildcat, as *Lynx ruffus* and its close relatives are variously called in different parts of the country, is one of the most widely distributed and best known of our wild animals. It is about two-thirds the size of the Canada lynx and characterized by much slenderer proportions, especially in its legs and feet. The ears are less conspicuously tufted and the tip of the tail is black only on its upper half. Bobcats range from Nova Scotia and southern British Columbia over practically all of the wooded and brushy parts of the United States except along the northern border, and extend south to the southern end of the high table-land of Mexico.

From the earliest settlement of America the

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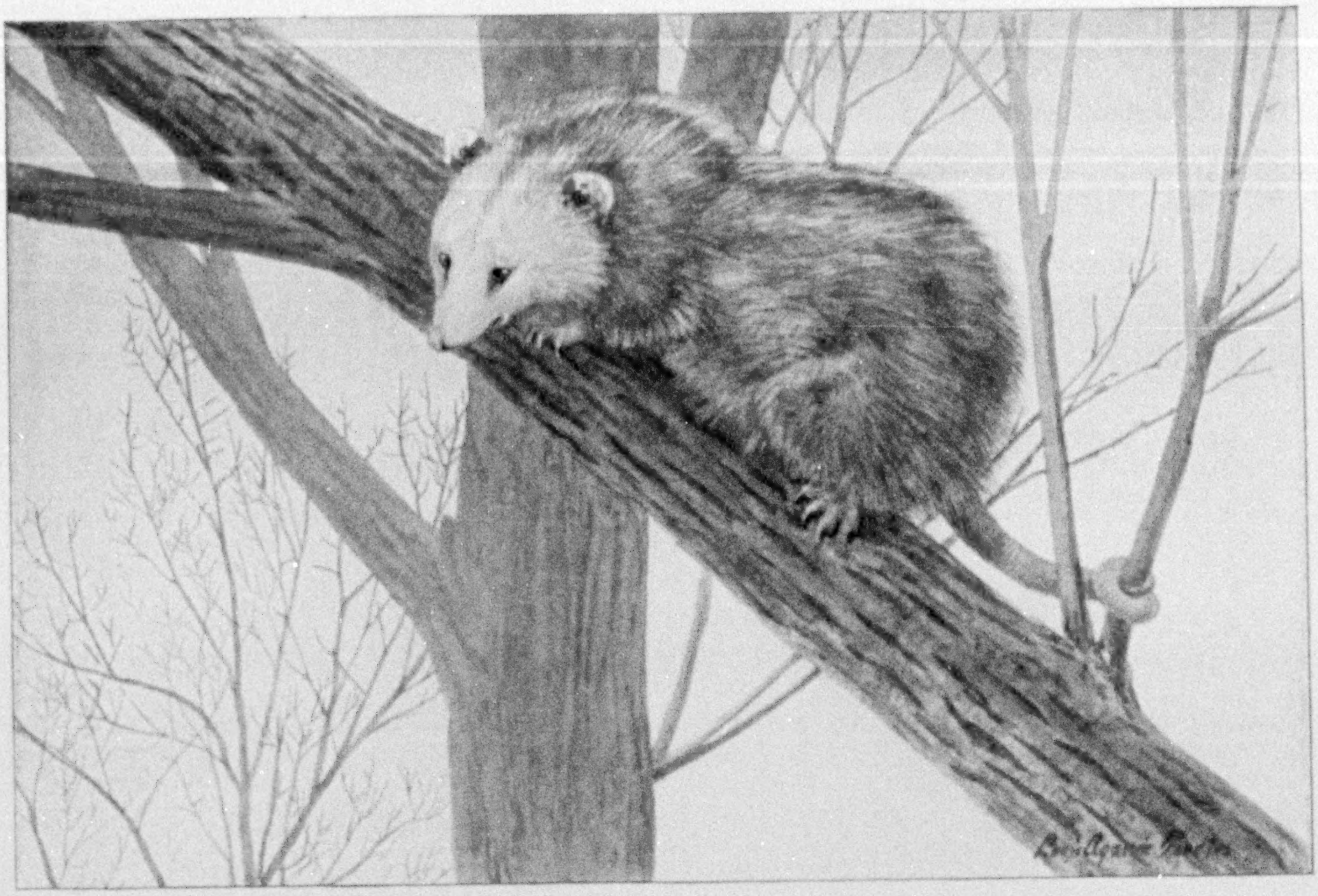
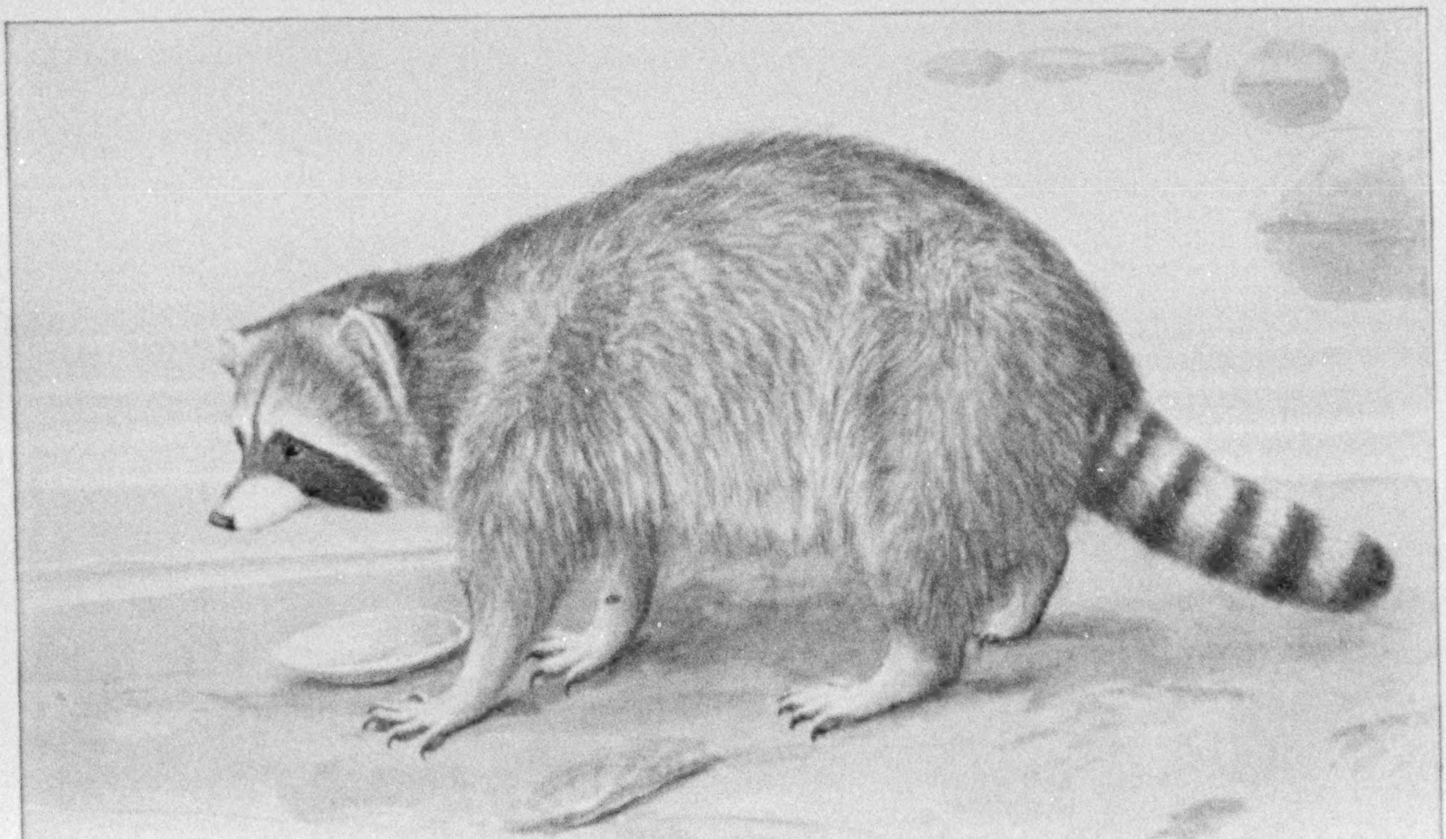
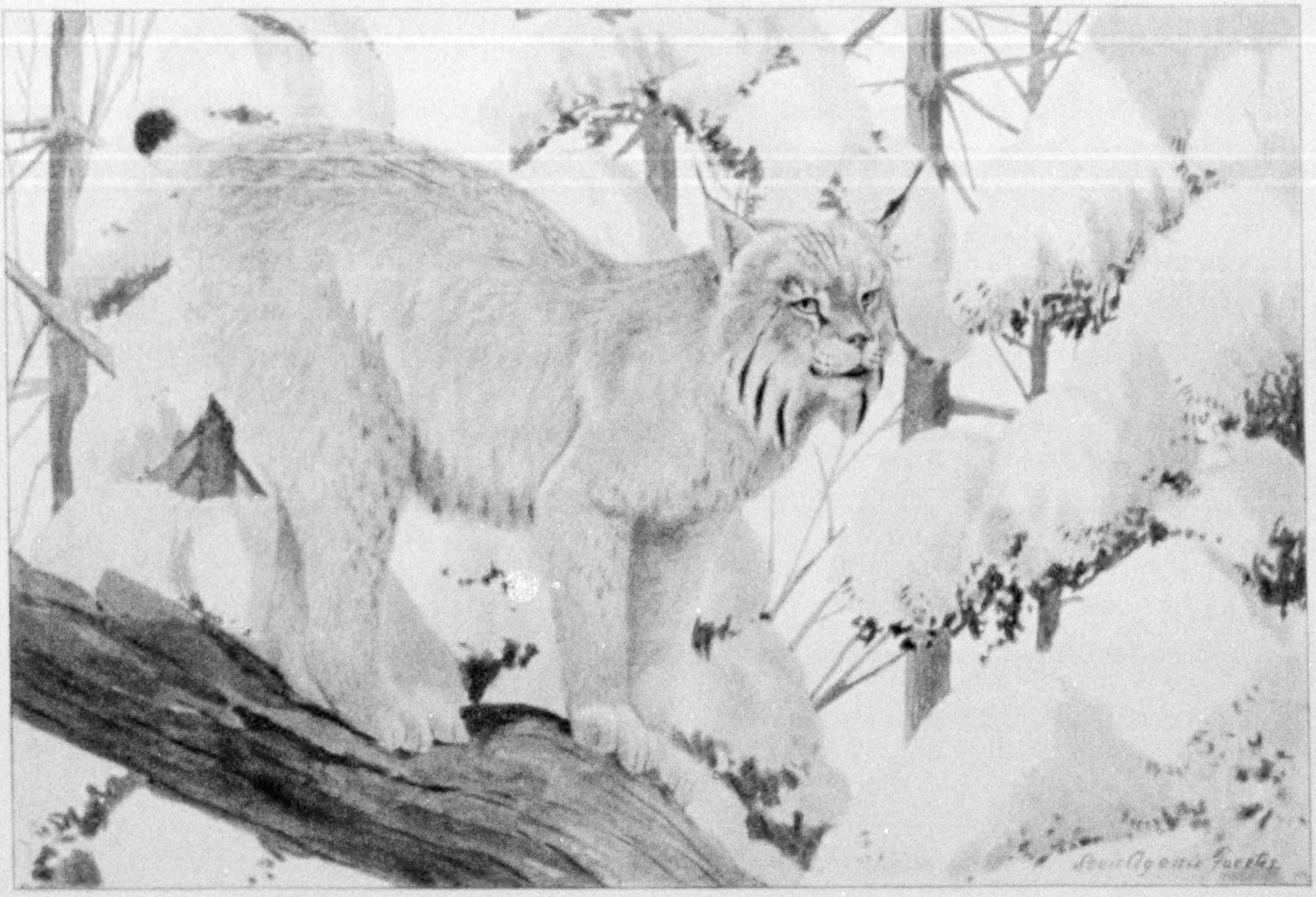

Louis Agassiz Fuertes

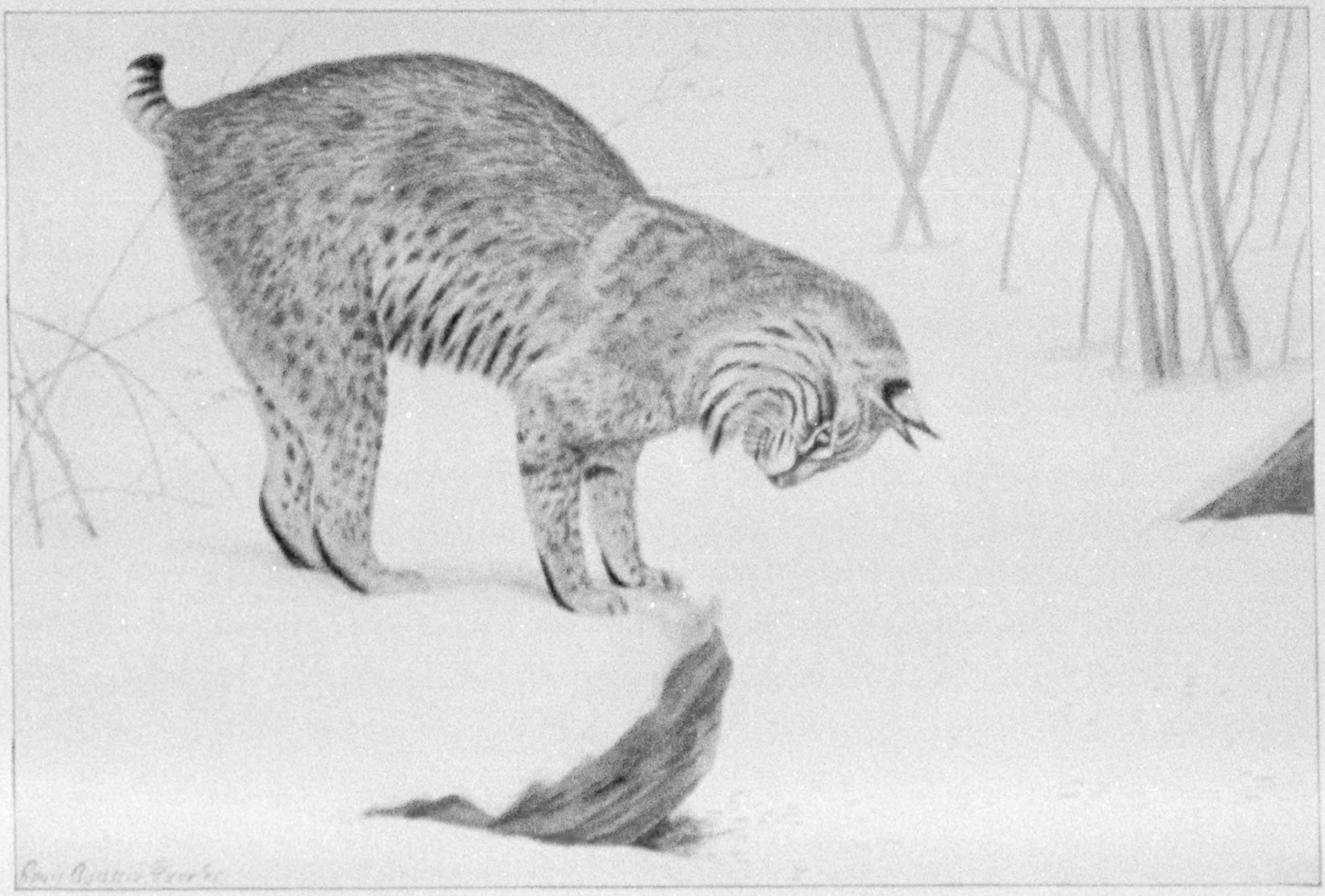
OPOSSUM


Louis Agassiz Fuertes.

RACCOON



CANADA LYNX



BOBCAT (Bay Lynx)

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bobcat has figured largely in hunting literature, and the popular estimate of its character is well attested by the frontier idea of the superlative physical prowess of a man who can "whip his weight in wildcats." Although our wildcat usually weighs less than 20 pounds, if its reputed fierceness could be sustained it would be an awkward foe. But, so far as man is concerned, unless it is cornered and forced to defend itself, it is extremely timid and inoffensive.

Like all cats, it is very muscular and active, and to the rabbits, squirrels, mice, grouse, and other small game upon which it feeds is a persistent and remorseless enemy. Although an expert tree-climber, it spends most of its time on the ground, where it ordinarily seeks its prey. It is most numerous in districts where birds and small mammals abound, and parts of California seem especially favorable for it. At a mountain ranch in the redwood forest south of San Francisco one winter some boys with dogs killed more than eighty bobcats.

Ordinarily the bobcat seems to be rather uncommon, but its nocturnal habits usually prevent its real numbers being actually known. In districts where not much hunted it is not uncommonly seen abroad by day, especially in winter, when driven by hunger.

The bay lynx makes its den in hollows in trees, in small caves, and in openings among rock piles wherever quiet and safety appear assured. Although a shy animal, it persists in settled regions if sufficient woodland or broken country remains to give it shelter. From such retreats it sallies forth at night, and not only do the chicken roosts of careless householders suffer, but toll is even taken among the lambs of sheep herds.

As in the case of most small cats, the stealthy hunting habits of the bay lynx renders it excessively destructive to ground-frequenting birds, especially to quail, grouse, and other game birds. For this reason, like many of its kind, it is outlawed in all settled parts of the country.

MOUNTAIN LION (Felis couguar and its subspecies)

The mountain lion, next to the jaguar, is the largest of the cat tribe native to America. In various parts of its range it is also known as the panther, cougar, and puma. It is a slender-bodied animal with a small head and a long round tail, with a total length varying from seven to nine feet and a weight from about 150 to 200 pounds.

It has from two to five young, which are paler brown than the adult and plainly marked with large dusky spots on the body and with dark bars on the tail. These special markings of the young, as in other animals, are ancestral, and here appear to indicate that in the remote past our plain brown panther was a spotted cat somewhat like the leopard.

No other American mammal has a range equal to that of the mountain lion. It originally inhabited both North and South America from southern Quebec and Vancouver Island to Patagonia and from the Atlantic to the Pacific coasts. Within this enormous territory it appears to be equally at home in an extraordinary variety of conditions. Formerly it was rather common in the Adirondacks of northern New York and still lives in the high Rocky Mountains of the West, where it endures the rigors of the severest winter temperatures. It is generally distributed, where large game occurs, in the treeless ranges of the most arid parts of the southwestern deserts, and is also well known in the most humid tropical forests of Central and South America, whose gloomy depths are drenched by almost continual rain.

A number of geographic races of the species have been developed by the varied character of its haunts. These are usually characterized by differences in size and by paler and grayer shades in the arid regions and by darker and browner ones in the humid areas.

The mountain lion, while powerful enough to be dangerous to man, is in reality extremely timid. Owing to its being a potentially dangerous animal, the popular conception of it is that of a fearsome beast, whose savage exploits are celebrated in the folk-lore of our frontier. As a matter of fact, few wild animals are less dangerous, although there are authentic accounts of wanton attacks upon people, just as there are authentic instances of buck deer and moose becoming aggressive. It has a wild, screaming cry which is thrillingly impressive when the shades of evening are throwing a mysterious gloom over the forests. In the mountains of Arizona one summer a mountain lion repeatedly passed along a series of ledges high above my cabin at dusk, uttering this loud weird cry, popularly supposed to resemble the scream of a terrified woman.

The mountain lion is usually nocturnal, but in regions where it is not hunted it not infrequently goes abroad by day. It is a tireless wanderer, often traveling many miles in a single night, sometimes in search of game and again in search of new hunting grounds. I have repeatedly followed its tracks for long distances along trails, and in northern Chihuahua I once tracked one for a couple of miles from a bare rocky hill straight across the open, grassy plain toward a treeless desert mountain, for which it was heading, some eight or ten miles away.

Although inoffensive as to people, this cat is such a fierce and relentless enemy of large game and live stock that it is everywhere an outlaw. Large bounties on its head have resulted in its extermination in most parts of the eastern United States and have diminished its numbers elsewhere. It is not only hunted with gun and dog but also with trap and poison.

A mountain lion usually secures its prey by a silent, cautious stalk, taking advantage of every cover until within striking distance, and then, with one or more powerful leaps, dashing the victim to the ground with all the stunning impact of its weight. In a beautiful live-oak forest on the mountains of San Luis Potosi I once trailed one of these great cats to the spot where it had killed a deer a short time before, and could plainly read in the trail the story of the admirable skill with which it had moved from cover to cover until it reached a knoll at one side of the little glade where the deer was feeding. Then a great leap carried it to the deer's back and struck the victim to the ground with such violence that it slid 10 or 12 feet across the sloping ground, apparently having been killed on the instant.

Another trail followed in the snow on the high mountains of New Mexico led to the top of a projecting ledge from which the lion had leaped out and down over 20 feet, landing on the back of a deer and sliding with it 50 feet or more down the snowy slope.

The mountain lion often kills calves, but is especially fond of young horses. In many range districts of the Western States and on the table-land of Mexico, owing to the depredations of this animal, it is impossible to raise horses. Unfortunately the predatory habits of this splendid cat are such that it can not continue to occupy the same territory as civilized man and so is destined to disappear before him.

JAGUAR (Felis hernandesi and its subspecies)

The jaguar, or "el tigre," as it is generally known throughout Spanish America, is the largest and handsomest of American cats. Its size and deep yellow color, profusely marked with black spots and rosettes, give it a close resemblance to the African leopard. It is, however, a heavier and more powerful animal. In parts of the dense tropical forests of South America coal-black jaguars occur, and while representing merely a color phase, they are popularly supposed to be much fiercer than the ordinary animal.

Jaguars are characteristic animals of the tropics in both Americas, frequenting alike the low jungle of arid parts as well as the great forests of the humid regions. In addition, they range south into Argentina and north into the southwestern United States. Although less numerous within our borders than formerly, they still occur as rare visitants as far north as middle Texas, middle New Mexico, and northern Arizona. They are so strictly nocturnal that their presence in our territory is usually not suspected until, after depredations on stock usually attributed to mountain lions, a trap or poison is put out and reveals a jaguar as the offender. Several have been killed in this way within our border during the last ten years, including one not far from the tourist hotel at the Grand Canyon of Arizona.

Although so large and powerful, the jaguar has none of the truculent ferocity of the African leopard. During the years I spent in its country, mainly in the open, I made careful inquiry without hearing of a single case where one had attacked human beings. So far as I could learn, it has practically the same shy and cowardly nature as the mountain lion. Despite this, the natives throughout its tropical home have a great fear of "el tigre," as I saw evidenced repeatedly in Mexico. Apparently this fear is based wholly on its strength and potential ability to harm man if it so desired.

Jaguars are very destructive to the larger game birds and mammals of their domain and to horses and cattle on ranches. On many large tropical ranches a "tigrero," or tiger hunter, with a small pack of mongrel dogs, is maintained, whose duty it is immediately to take up the trail when a "tigre" makes its presence known, usually by killing cattle. The hunter steadily continues the pursuit, sometimes for many days, until the animal is either killed or driven out of the district. It is ordinarily hunted with dogs, which noisily follow the trail, but its speed through the jungle often enables it to escape. When hard pressed it takes to a tree and is easily killed.

Few predatory animals are such wanderers as the jaguar, which roams hundreds of miles from its original home, as shown by its occasional appearance far within our borders. In the heavy tropical forest it so commonly follows the large wandering herds of white-lipped peccaries that some of the Mexicans contend that every large herd is trailed by a tiger to pick up stragglers. Along the Mexican coast in spring, when sea turtles crawl up the beaches to bury their eggs in the sand, the rising sun often reveals the fresh tracks of the jaguar where it has traveled for miles along the shore in search of these savory deposits.

In one locality on the Pacific coast of Guerrero I found that the hardier natives had an interesting method of hunting the "tigre" during the mating period. At such times the male has the habit of leaving its lair near the head of a small canyon in the foothills early in the evening and following down the canyon for some distance, at intervals uttering a subdued roar. On moonlight nights at this time the hunter places an expert native with a short wooden trumpet near the mouth of the canyon to imitate the "tigre's" call as soon as it is heard and to repeat the cry at proper intervals. After placing the caller, the hunter ascends the canyon several hundred yards and, gun in hand, awaits the approach of the animal. The natives have many amusing tales of the sudden exit of untried hunters when the approaching animal unexpectedly uttered its roar at close quarters.

JAGUARUNDI CAT, OR EYRA (Felis cacomitli and its subspecies)

The eyra differs greatly in general appearance from any of our other cats, although it is one of the most characteristic of the American members of this widely spread family. It is larger than an otter, with a small flattened head, long body, long tail, and short legs, thus having a distinctly otterlike form. It is characterized by two color phases—one a dull gray or dusky, and the other some shade of rusty rufous. Animals of these different colors were long supposed to represent distinct species, but

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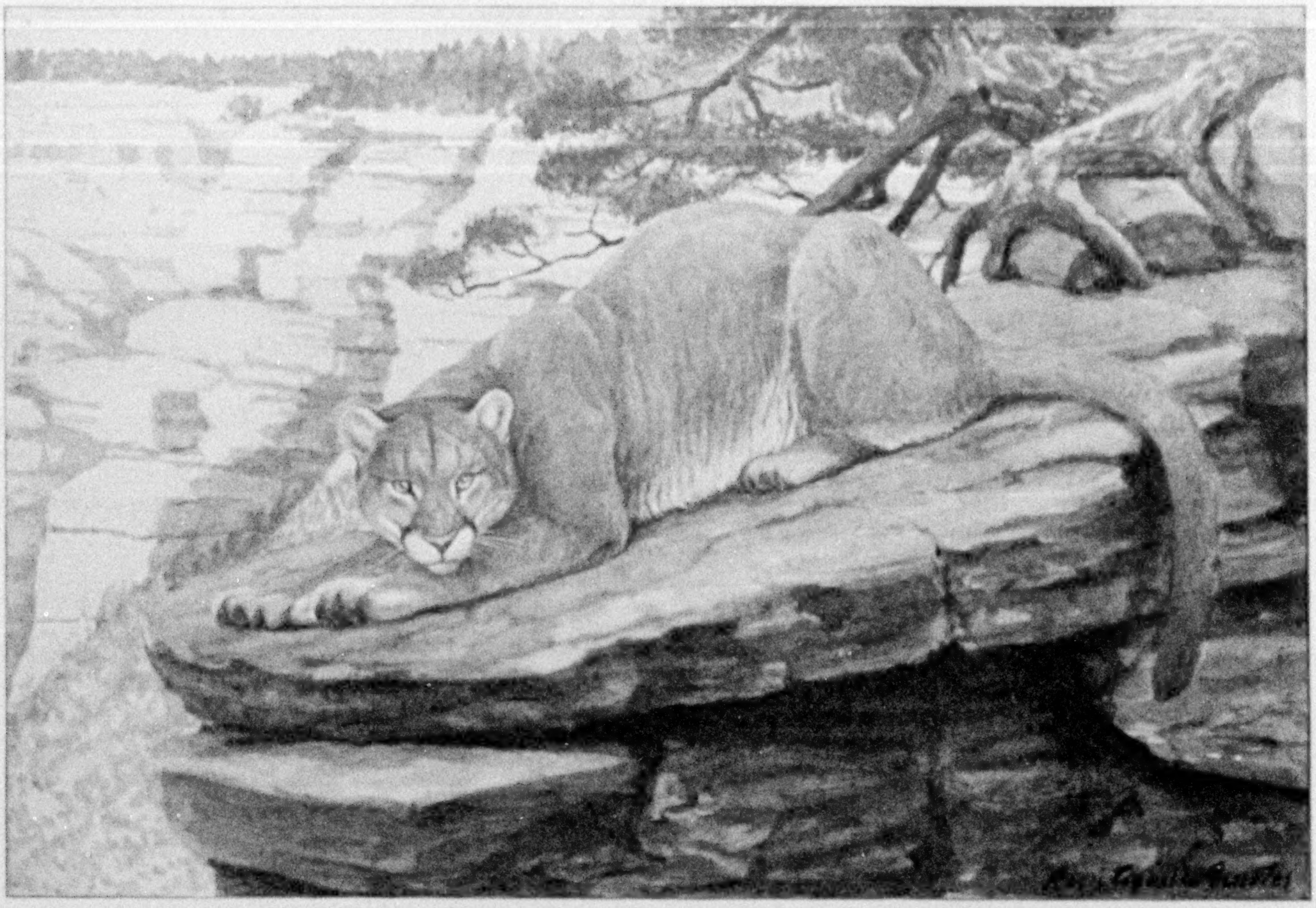
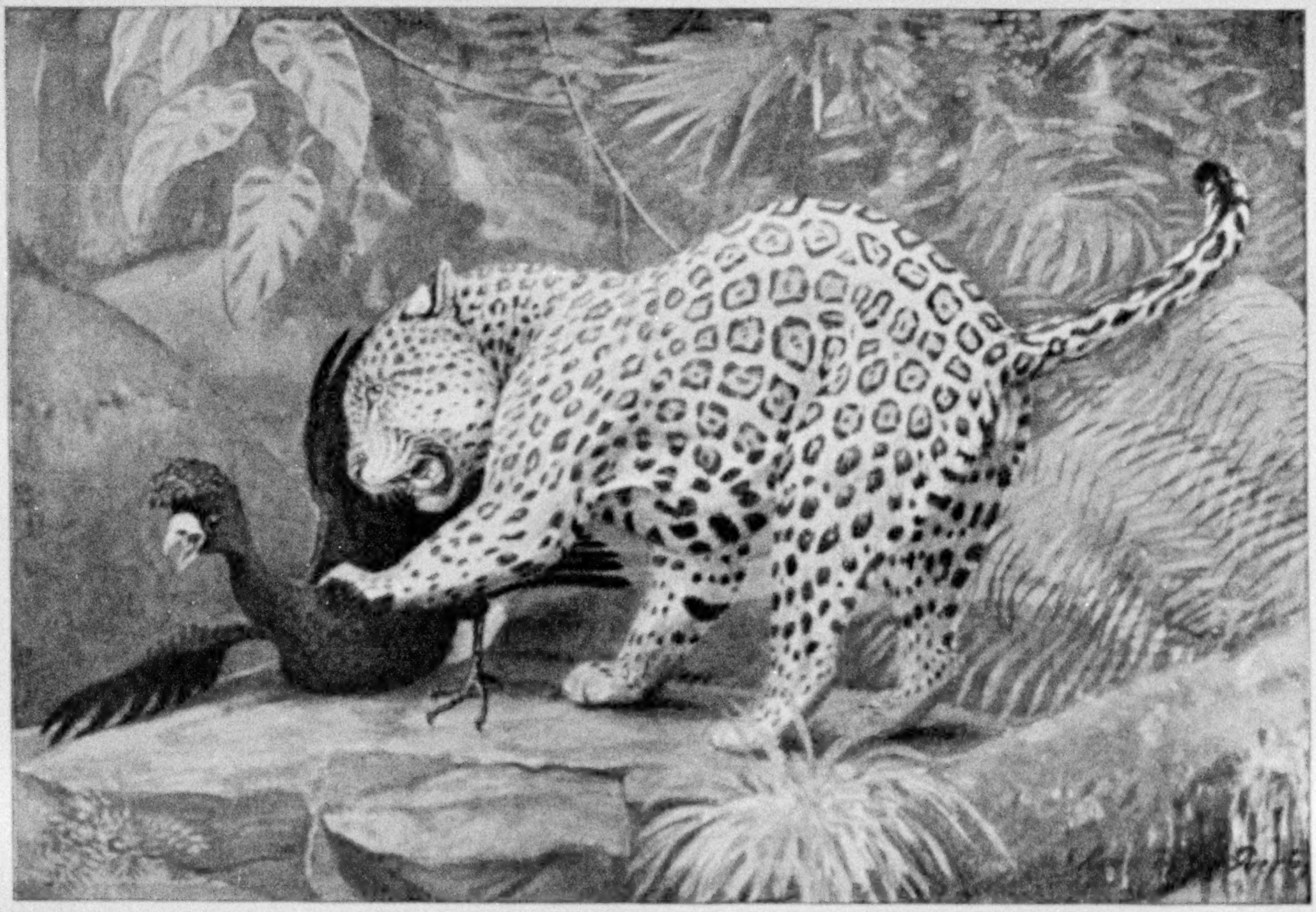
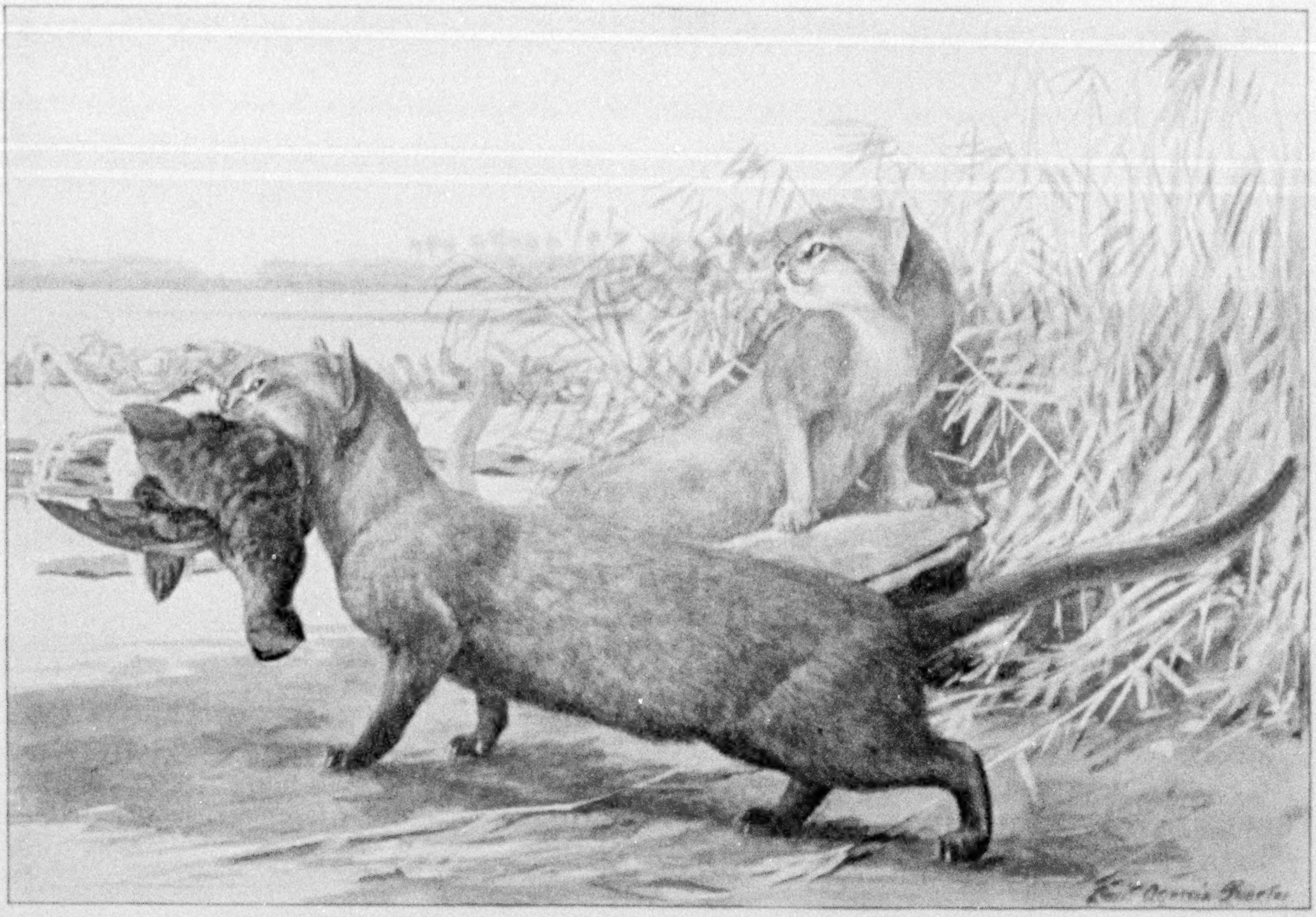


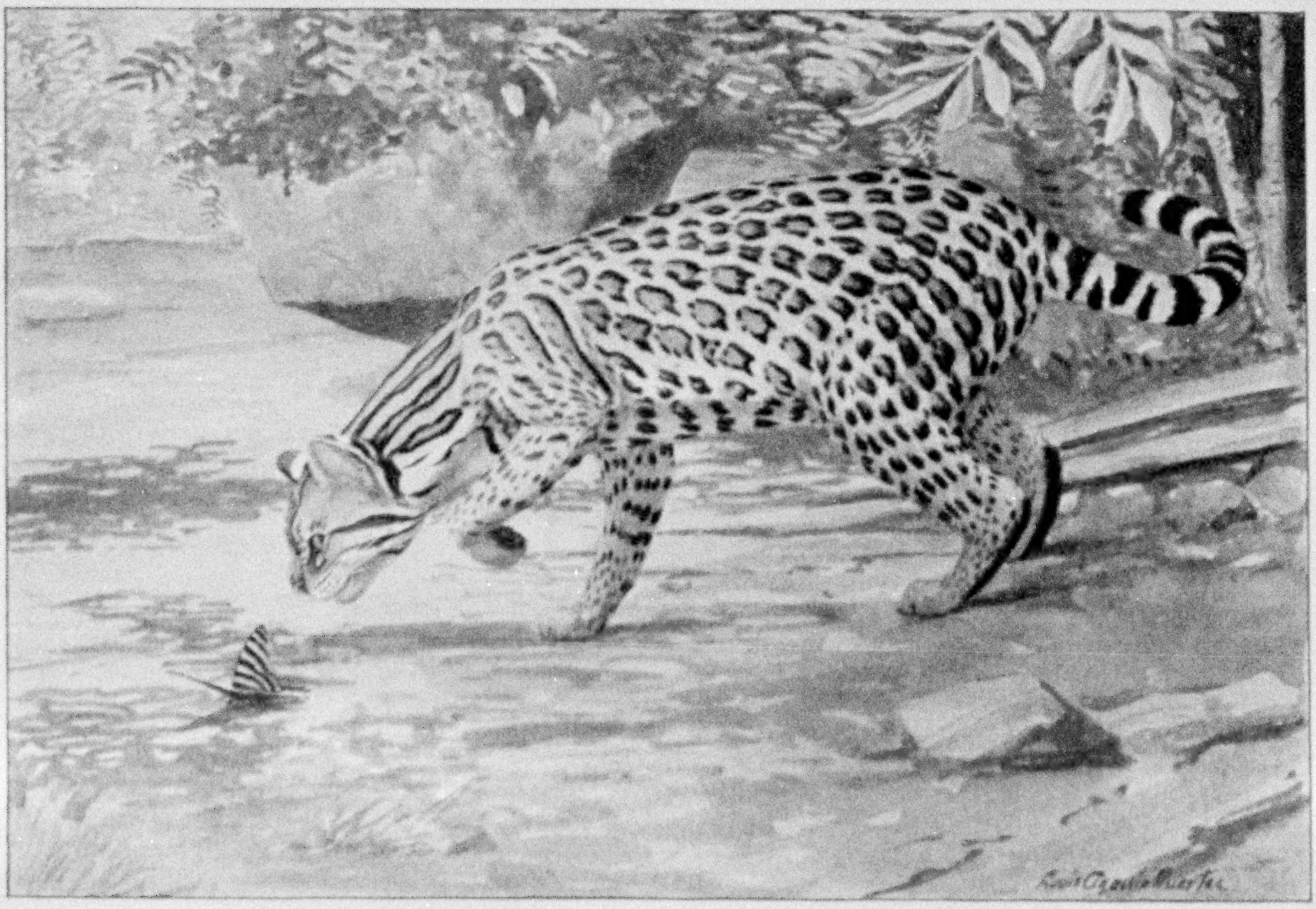
MOUNTAIN LION



JAGUAR



RED AND GRAY PHASES OF THE JAGUARUNDI CAT, OR EYRA



TIGER-CAT, OR OCELOT

XUM

it has been learned not only that color is the only difference between the two, but also that the two colors are everywhere found together, affording satisfactory evidence that they are merely color phases of the same species.

The eyra is a habitant of brush-grown or forested country, mainly in the lowlands, from the lower Rio Grande Valley of Texas south to Paraguay. In this vast territory it has developed a number of geographic races.

In southern Texas, where it is often associated with the ocelot, the eyra lives in dense thorny thickets of mesquites, acacias, ironwood, and other semitropical chaparral in a region of brilliant sunlight; but farther south it also roams the magnificent forests of the humid tropics, in which the sun rarely penetrates. It appears to be even more nocturnal and retiring than most of our cats, and but little is known of its life history. The results of thorough trapping in the dense thorny thickets near Brownsville, Texas, indicate that it is probably more common than is generally supposed.

The natives in the lowlands of Guerrero, on the Pacific coast of Mexico, informed me that the eyra in that region is fond of the vicinity of streams, and that it takes to the water and swims freely, crossing rivers whenever it desires. Its otterlike form goes well with such habits, and further information may prove that it is commonly a water-frequenting animal. Its unusual form and dual coloration and our lack of knowledge regarding the life of the eyra unite to make it one of the most interesting of our carnivores.

TIGER-CATS, OR OCELOTS (Felis pardalis and its relatives)

The brushy and forested areas of America from southern Texas and Sonora to Paraguay are inhabited by spotted cats of different species, varying from the size of a large house cat to that of a Canada lynx. Only one of these occurs in the United States. All are characterized by long tails and a yellowish ground color, conspicuously marked by black spots, and on neck and back by short, longitudinal stripes—a color pattern that strongly suggests the leopard.

In the lower Rio Grande Valley of Texas the tiger-cat is rather common, with the eyra-cat, in areas densely overgrown with thorny chaparral. Like most of the cat tribe, it is strictly nocturnal and by day lies well hidden in its brushy shelter. By night it wanders along trails over a considerable territory, seeking its prey. Birds of all kinds, including domestic poultry, are captured on their roosts, and rabbits, wood rats, and mice of many kinds, as well as snakes and other reptiles, are on its list of game.

Its reptile-eating habit was revealed to me unexpectedly one day in the dense tropical forest of Chiapas. I was riding along a steep trail beside a shallow brush-grown ravine when a tiger-cat suddenly rushed up the trunk of a tree close by. A lucky shot from my revolver brought it to the ground, and I found it lying in the ravine by the body of a recently killed boa about 6 or 7 feet long. It had eaten the boa's head and neck when my approach interrupted the feast.

The first of these cats I trapped in Mexico was captured the night after my arrival, in a trail bordering the port of Manzanillo, on the Pacific coast. The rejoicing of the natives living close by evidenced the toll this marauder had been taking from their chickens.

The tiger-cat is much more quiet and less fierce in disposition than most felines. It excited my surprise and interest whenever I trapped one to note how nonchalantly it took the situation. The captive never dashed wildly about to escape, but when I drew near sat and looked quietly at me without the slightest sign of alarm and with little apparent interest. A small trap-hold, even on the end of a single toe, was enough to retain the victim. On one occasion, while a cat thus held sat looking at me, it quietly reached to one side and sank its teeth into the bark of a small tree to which the trap was attached, and then resumed its air of unconcern.

The tiger-cat brings within our fauna an interesting touch of the tropics and its exuberance of animal life. It is found in so small a corner of our territory, however, that, despite its mainly inoffensive habits, it is certain to be crowded out in the near future by the increased occupation of its haunts.

RED FOX (Vulpes fulva and its relatives)

Red foxes are characterized by their rusty red fur, black-fronted fore legs, and white-tipped tail. They inhabit the forested regions in the temperate and subarctic parts of both Old and New Worlds, and, like other types of animal life having a wide range, they break up into numerous distinct species and geographic races.

In America they originally ranged over nearly all the forested region from the northern limit of trees in Alaska and Canada south, east of the Great Plains, to Texas; also down the Rocky Mountains to middle New Mexico, and down the Sierra Nevada to the Mount Whitney region of California. They are unknown on the treeless plains of the West, including the Great Basin. Originally they were apparently absent from the Atlantic and Gulf States from Maryland to Louisiana, but have since been introduced and become common south to middle Georgia and Alabama.

Wherever red foxes occur they show great mental alertness and capacity to meet the requirements of their surroundings. In New England they steadily persist, though their raids on poultry yards have for centuries set the hand of mankind against them. For a time conditions favored them in parts of the Middle Atlantic States, for the sport of hunting to hounds was imported from England, and the foxes had partial protection. This exotic amusement has now passed and the fox must everywhere depend on his nimble wits for safety.

Since the days of Æsop's fables tales of foxes and their doings have had their place in literature as well as in the folk-lore of the countryside. Many of their amazing wiles to outwit pursuers or to capture their prey give evidence of extraordinary mental powers.

Their bill of fare includes many items, as mice, birds, reptiles, insects, many kinds of fruits, and on rare occasions a chicken. The bad name borne by them among farmers, due to occasional raids on the poultry yard, is largely unwarranted. They kill enormous numbers of mice and other small rodents each year, and thus well repay the loss of a chicken now and then.

Red foxes apparently pair for life and occupy dens dug by themselves in a secluded knoll or among rocks. These dens, which are sometimes occupied for years in succession, always have two or more entrances opening in opposite directions, so that an enemy entering on one side may be readily eluded. The young, numbering up to eight or nine, are tenderly cared for by both parents.

Although they have been persistently hunted and trapped in North America since the earliest times, they still yield a royal annual tribute of furs. It is well known that the highly prized cross, as well as the precious black, and silver gray foxes are merely color phases occurring in litters of the ordinary red animal. Black skins are so highly prized that specially fine ones have sold for more than $2,500 each in the London market. The reward thus offered has resulted in the development of black fox fur-farms, which have been very successful in parts of Canada and the United States, thus originating a valuable new industry.

By the modern regulation of trapping, foxes and other fur-bearers are destined to survive wherever conditions are favorable. In addition to the economic value of foxes, the location of an occasional fox den here and there on the borders of a woodland tract, the meandering tracks in the snow, and the occasional glimpse of animals cautiously making their rounds add a keen touch of primitive nature well worth preserving in any locality.

ALASKA RED FOX (Vulpes kenaiensis)

The red fox of the Kenai Peninsula, Alaska, and the adjacent mainland is probably the largest of its kind in the world, although those of Kodiak Island and of the Mackenzie River valley are nearly as large. Compared with its relatives of the United States, the Kenai fox is a giant, with heavier, duller-colored coat and a huge tail, more like that of a wolf than of a fox. The spruce and birch forests of Alaska and the Mackenzie Valley are apparently peculiarly adapted to red foxes, as shown by the development there of these animals—good illustrations of the relative increase in size and vigor of animals in a specially favorable environment.

As noted in the general account of the red foxes, the occurrence of the black phase is sporadic, and the relative number of dark individuals varies greatly in different parts of their range. The region about the upper Yukon and its tributaries and the Mackenzie River basin are noted for the number of black foxes produced, apparently a decidedly greater proportion than in any other similarly large area. The prices for which these black skins sell in the London market prove them to be of equal quality with those from any other area.

Like other red foxes, the Alaskan species digs its burrows, with several entrances, in some dry secluded spot, where both male and female share in the care of the young. In northern wilds the food problem differs from that in a settled country. There the surrounding wild life is the only dependence, and varying hares, lemmings, and other mice are usually to be had by the possessor of a keen scent and an active body. In summer many nesting wild-fowl and their young are easy prey, while heathberries and other northern fruits are also available.

Winter brings a season of scarcity, when life requires the exercise of every trained faculty. The snow-white ptarmigan is then a prize to be gained only by the most skillful stalking, and the white hare is almost equally difficult to secure. At this season foxes wander many miles each day, their erratic tracks in the snow telling the tale of their industrious search for prey in every likely spot. It is in this season of insistent hunger that many of them fall victims to the wiles of trappers or to the unscrupulous hunter who scatters poisoned baits.

Fortunately the season for trapping these and other fur-bearers in Alaska is now limited by law and the use of poisons is forbidden. These measures will aid in preserving one of the valuable natural assets of these northern wilds.

GRAY FOX (Urocyon cinereoargenteus and its relatives)

Gray foxes average about the size of common red foxes, but are longer and more slender in body, with longer legs and a longer, thinner tail. They are peculiar to America, where they have a wide range—from New Hampshire, Wisconsin, and Oregon south through Mexico and Central America to Colombia. Within this area there are numerous geographic forms closely alike in color and general appearance, but varying much in size; the largest of all, larger than the red fox, occupying the New England States.

Gray foxes inhabit wooded and brush-grown country and are much more numerous in the arid or semiarid regions of the southwestern United States and western Mexico than elsewhere. In parts of California they are far more numerous than red foxes ever become. They do not regularly dig a den, but occupy a hollow tree or cavity in the rocks, where they bring forth from three to five young each spring. As with other foxes, the cubs are born blind and helpless, and are also almost blackish in color, entirely unlike the adults. The par-

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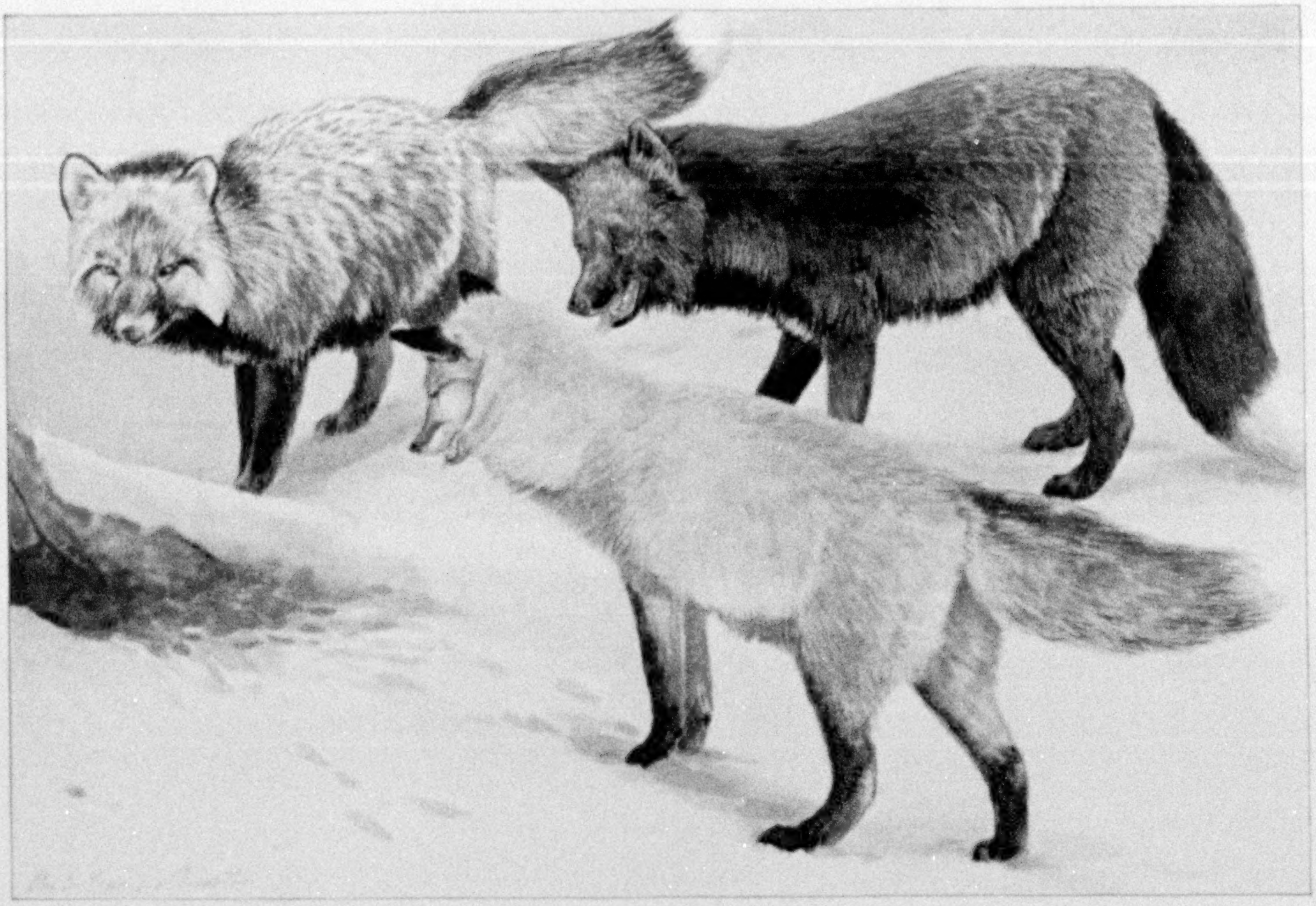
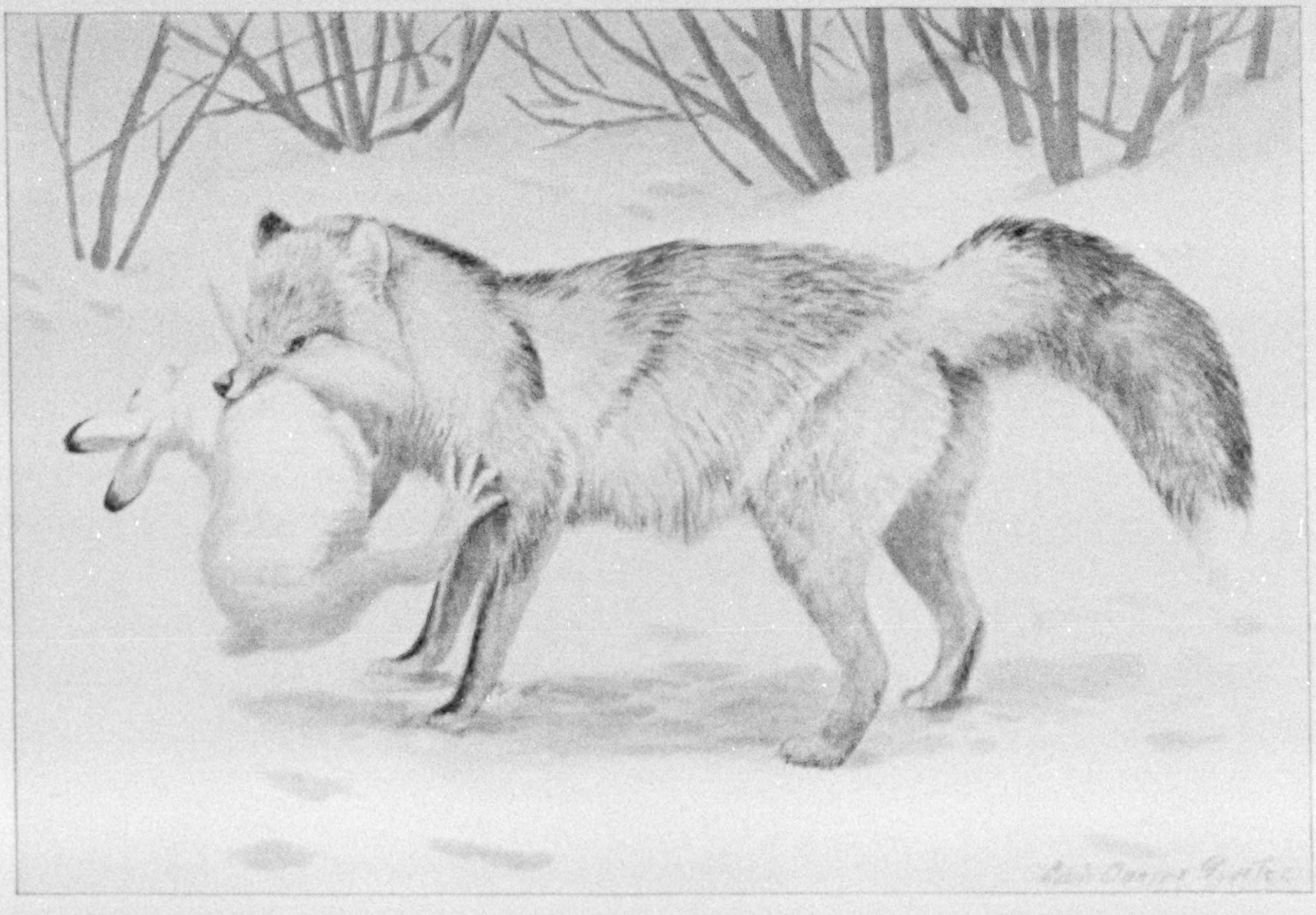
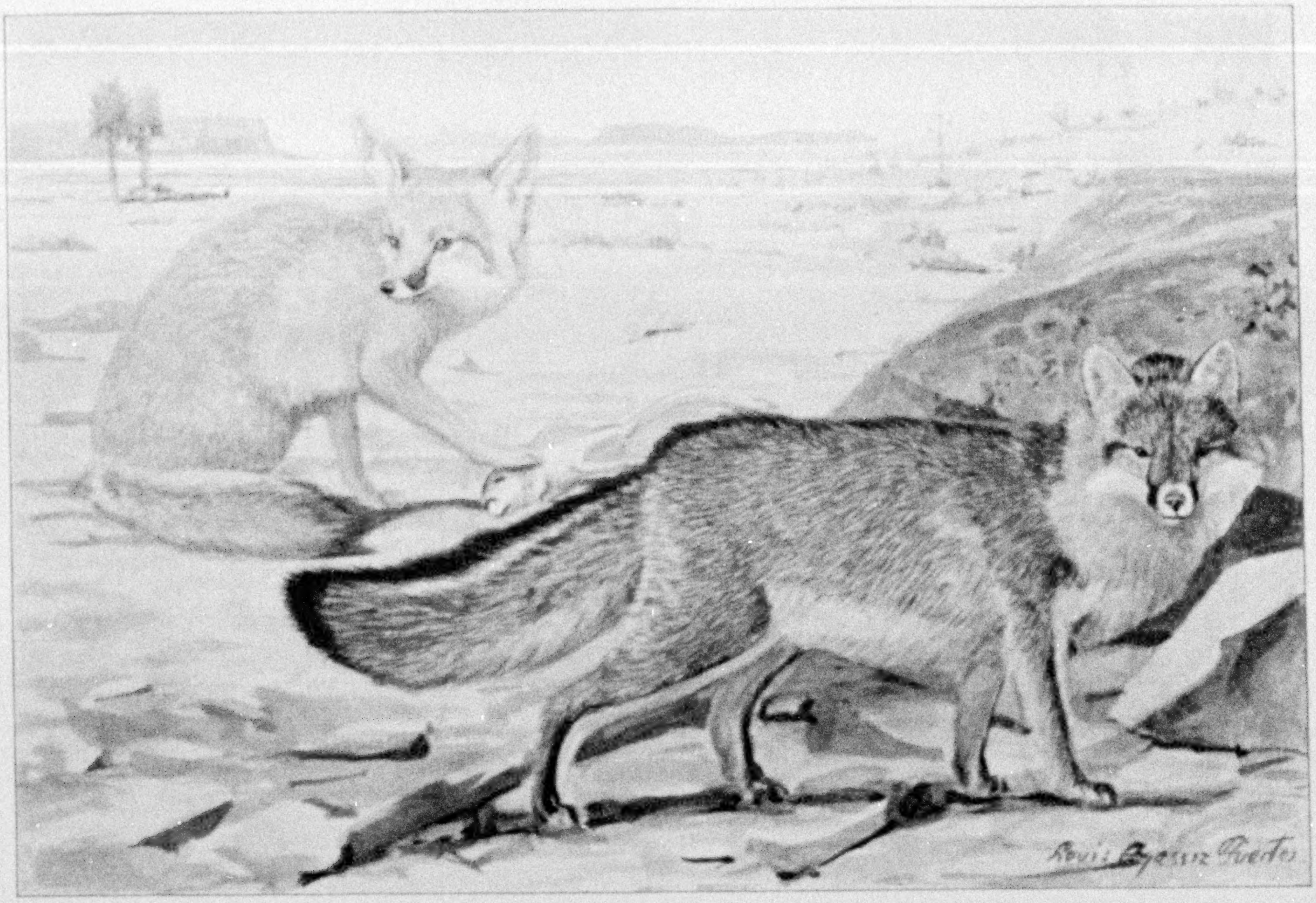


CROSS FOX RED FOX SILVER FOX

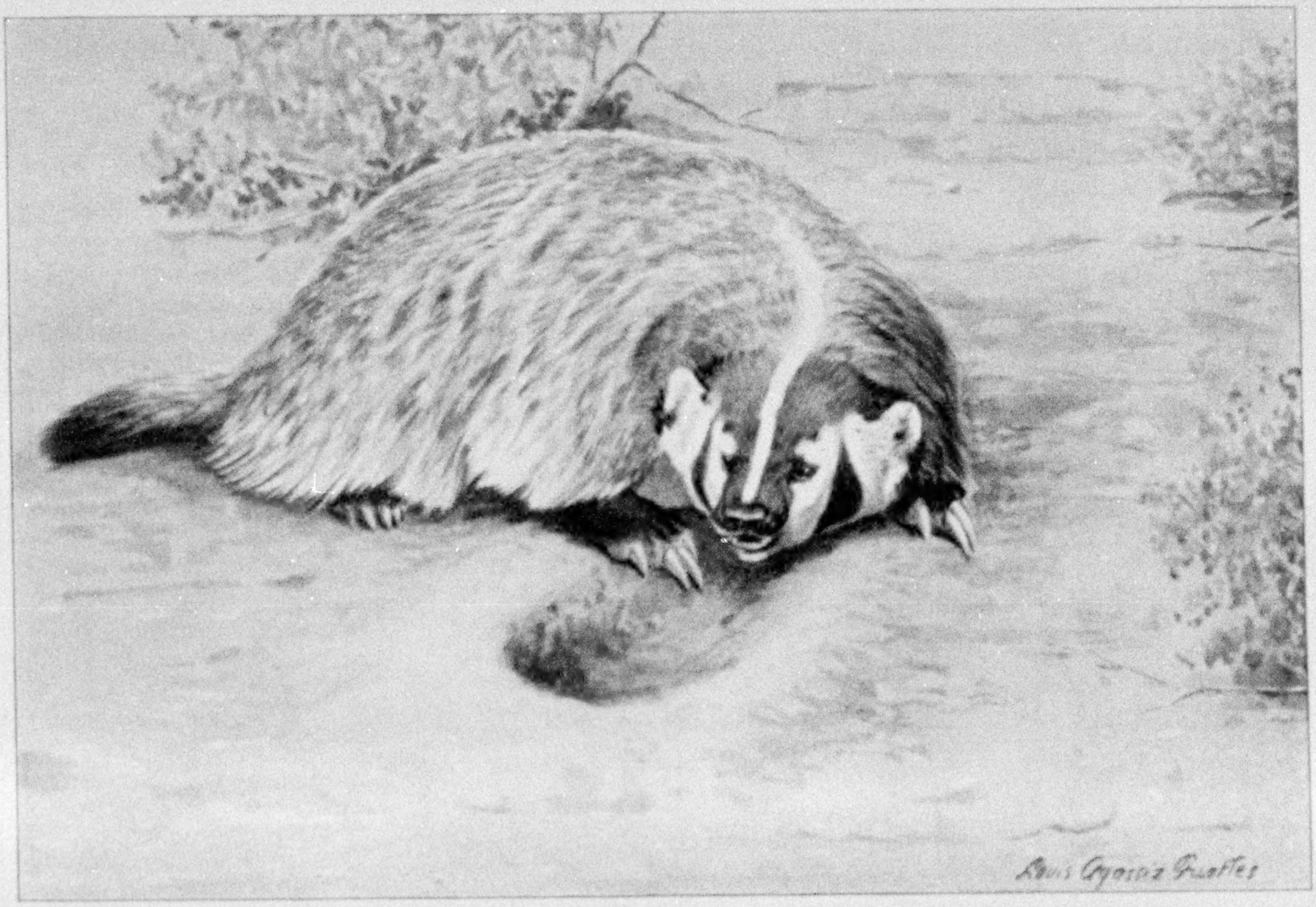
The precious black and silver gray foxes are merely color phases occurring in litters of the ordinary red animal (see text, page 416)



ALASKA RED FOX



DESERT FOX GRAY FOX



BADGER

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ents, as usual with all members of the dog family, are devoted to their young and care for them with the utmost solicitude.

Like other members of the tribe, they are omnivorous and feed upon mice, squirrels, rabbits, birds, and large insects, in addition to acorns or other nuts and fruits of all kinds. In Lower California they are very common about the date-palm orchards, which they visit nightly for fallen fruit. They also make nocturnal visits to poultry yards.

In some parts of the West they are called "tree foxes," because when pursued by dogs they often climb into the tops of small branching trees.

On one occasion in Arizona I saw a gray fox standing in the top of a large, leaning mesquite tree, about thirty feet from the ground, quietly gazing in various directions, as though he had chosen this as a lookout point. As soon as he saw me he came down at a run and swiftly disappeared.

In the same region I found a den in the hollow base of an old live-oak containing three young only a few days old. The mother was shot as she sprang from the hole on my approach and the young taken to camp. There the skin of the old fox, well wrapped in paper, was placed on the ground at one side of the tent, and an open hunting bag containing the young placed on the opposite side, about ten feet away. On returning an hour later, I was amazed to find that all three of the young, so small they could crawl only with the utmost difficulty, and totally blind, had crossed the tent and managed to work their way through the paper to the skin of their mother, thus showing that the acute sense of smell in these foxes becomes of service to them at a surprisingly early age.

DESERT FOX (**Vulpes macrotis** and its subspecies)

A small fox, akin to the kit fox or swift of the western plains, frequents the arid cactus-grown desert region of the Southwest. It is found from the southern parts of New Mexico, Arizona, and California south into the adjacent parts of Mexico. The desert fox is a beautiful species, slender in form, and extraordinarily quick and graceful in its movements, but so generally nocturnal in habits as to be rarely seen by the desert traveler. On the rare occasions when one is encountered abroad by day, if it thinks itself unobserved by the traveler it usually flattens itself on the ground beside any small object which breaks the surface, and thus obscured will permit a horseman to ride within a few rods without moving. If the traveler indicates by any action that he has seen it, the fox darts away at extraordinary speed, running with a smooth, floating motion which seems as effortless as that of a drifting thistledown before a breeze.

The desert fox digs a burrow, with several entrances, in a small mound, or at times on an open flat, and there rears four or five young each year. Its main food consists of kangaroo rats, pocket mice, small ground-squirrels, and a variety of other small desert mammals. In early morning fox tracks, about the size of those of a house-cat, may be seen along sandy arroyos and similar places where these small carnivores have wandered in search of prey.

Like the kit, the desert fox has little of the sophisticated mental ability of the red fox and falls an easy prey to the trapper. It is nowhere numerous and occupies such a thinly inhabited region that there is little danger of its numbers greatly decreasing in the near future.

BADGER (**Taxidea taxus** and its subspecies)

The favorite home of the badger is on grassy, brush-grown plains, where there is an abundance of mice, pocket gophers, ground-squirrels, prairie-dogs, or other small mammals. There it wanders far and wide at night searching for the burrows of the small rodents, which are its chief prey. When its acute sense of smell announces that a burrow is occupied, it sets to work with sharp claws and powerful fore legs and digs down to the terrified inmate in an amazingly short time.

The trail of a badger for a single night is often marked by hole after hole, each with a mound of fresh earth containing the tracks of the marauder. As a consequence, if several of these animals are in the neighborhood, their burrows, 6 or 8 inches in diameter, soon become so numerous that it is dangerous to ride rapidly through their haunts on horseback.

Although a member of the weasel family, the badger is so slow-footed that when it is occasionally found abroad by day a man on foot can easily overtake it. When brought to bay, it charges man or dog and fights with such vicious power and desperation that nothing of its own size can overcome it. It appears to have a morose and savage nature, lacking the spice of vivacity or playfulness which appears in many of its relatives.

Although commonly found living by itself in a den, it is often found moving about by day in pairs, indicating the probability that it may mate permanently. In the northern part of its range it hibernates during winter, but in the south remains active throughout the year. Its shy and retiring character is evidenced by the little information we have concerning its family life. The badger is so destructive to rodents that its services are of great value to the farmer. Regardless of this, where encountered it is almost invariably killed. As a consequence, the increasing occupation of its territory must result in its steady decrease in numbers and final extermination.

The American badger is a close relative of the well-known badger occupying the British Isles and other northern parts of the Old World. It is a low, broad, short-legged, powerfully built animal of such wide distribution that it has developed several geographic races. Its range originally extended from about 58 degrees of latitude, on the Peace River, in

Canada, south to the plains of Puebla, on the southern end of the Mexican table-land, and from Michigan, Kansas, and Texas west to the Pacific coast. It has now become extinct over much of this area and is everywhere greatly reduced in numbers.

It appears to thrive equally well on the plains of Alberta, in the open pine forests of the Sierra Nevada in California, and on the dry tropical lowlands at the southern end of the Peninsula of Lower California.

ARCTIC WOLF (Canis tundrarum)

In order to fit properly into a high northern environment, Arctic wolves have developed white coats, which they wear throughout the year. They are among the largest of their kind and have all the surpassing vigor needful for successful beasts of prey in the rigors of such a home. Nature is more than ordinarily hard on weaklings in the far North and only the fittest survive.

The range of the white wolves covers the treeless barren grounds bordering the Arctic coast of Alaska and Canada and extending thence across the Arctic islands to the north coast of Greenland beyond 83 degrees of latitude.

The short summer in the far North is the season of plenty, during which swarms of wildfowl furnish a bountiful addition to the regular food supply. Young wolves are reared and the pack feeds fat, laying up a needed reserve strength for the coming season of darkness. When winter arrives lemmings and Arctic hares and an occasional white fox furnish an uncertain food supply for such insistent hunger as that of wolves, and larger game is a necessity.

In the northern part of their range they share with the other denizens of that land the months of continuous night. There, amid relentless storms and iron frosts, the trail, once found, must be held to the end. The chase is made in the gloom of continuous night and the white caribou or musk-ox herd is brought to bay, and by the law of the pack food is provided.

White wolves are the one dreaded foe Nature has given the musk-ox and the caribou in the northern wilds. The number of the wolves, as with other carnivores, varies with the abundance of their chief prey, and they will disappear automatically with the caribou and musk-oxen.

GRAY, OR TIMBER, WOLF (Canis nubilus and its relatives)

Large wolves, closely related to those of Europe and Siberia, once infested practically all of Arctic and temperate North America, excepting only the arid desert plains. This range extended from the remotest northern lands beyond 83 degrees of latitude south to the mountains about the Valley of Mexico.

When America was first colonized by white men, wolves were numerous everywhere in proportion to the great abundance of game animals. With the increased occupation of the continent and the destruction of most of its large game, wolves have entirely disappeared from large parts of their former domain. They still occur in varying numbers in the forest along our northern border from Michigan westward, and south along the Rocky Mountains and the Sierra Madre to Durango, Mexico, and also in all the Gulf States.

The variations in climate and other physical conditions within their range has resulted in the development of numerous geographic races, and perhaps of species, of wolves, which show marked differences in size and color. The white Arctic wolf, described on pages 421 and 424, is one of the most notable of these, but the gray wolf of the Rocky Mountain region and the eastern United States is the best known.

Since the dawn of history Old World wolves, when hunger pressed, have not hesitated to attack men, and in wild districts have become a fearful scourge. American wolves have rarely shown this fearlessness toward man, probably owing to the abundance of game before the advent of white men and to the general use of firearms among the pioneers. That wolves are extremely difficult to exterminate is shown by their persistence to the present day in parts of France and elsewhere in Europe. This is due both to their fecundity (they have from eight to twelve young), and to their keen intelligence, which they so often pit successfully against the wiles of their chief enemy—man.

Gray wolves appear to mate permanently, and in spring their young are born in natural dens among great rocks, or in a burrow dug for the purpose in a hillside. There both parents exercise the greatest vigilance for the protection of the young. The male kills and brings in game and stands guard in the neighborhood, while the mother devotes most of her time to the pups while they are very small. At other times of year packs made up of one or more pairs and their young hunt together with a mutual helpfulness in pursuing and bringing down their prey that shows a high order of intelligence. Wolves are in fact first cousins of the dog, whose mental ability is recognized by all.

During the existence of the great buffalo herds, packs of big gray "buffalo wolves" roamed the western plains, taking toll wherever it pleased them. Since these vast game herds have disappeared only a small fraction of the wolves have survived. There are enough, however, not only to commit great ravages among the deer and other game in northern Michigan and on the coastal islands of Alaska, but also to destroy much live stock in the Rocky Mountain region.

So serious have the losses in cattle and sheep on the ranges become that Congress has recently made large appropriations for the destruction of wolves and other predatory animals, and these disturbers of the peace will soon become much reduced in numbers. The

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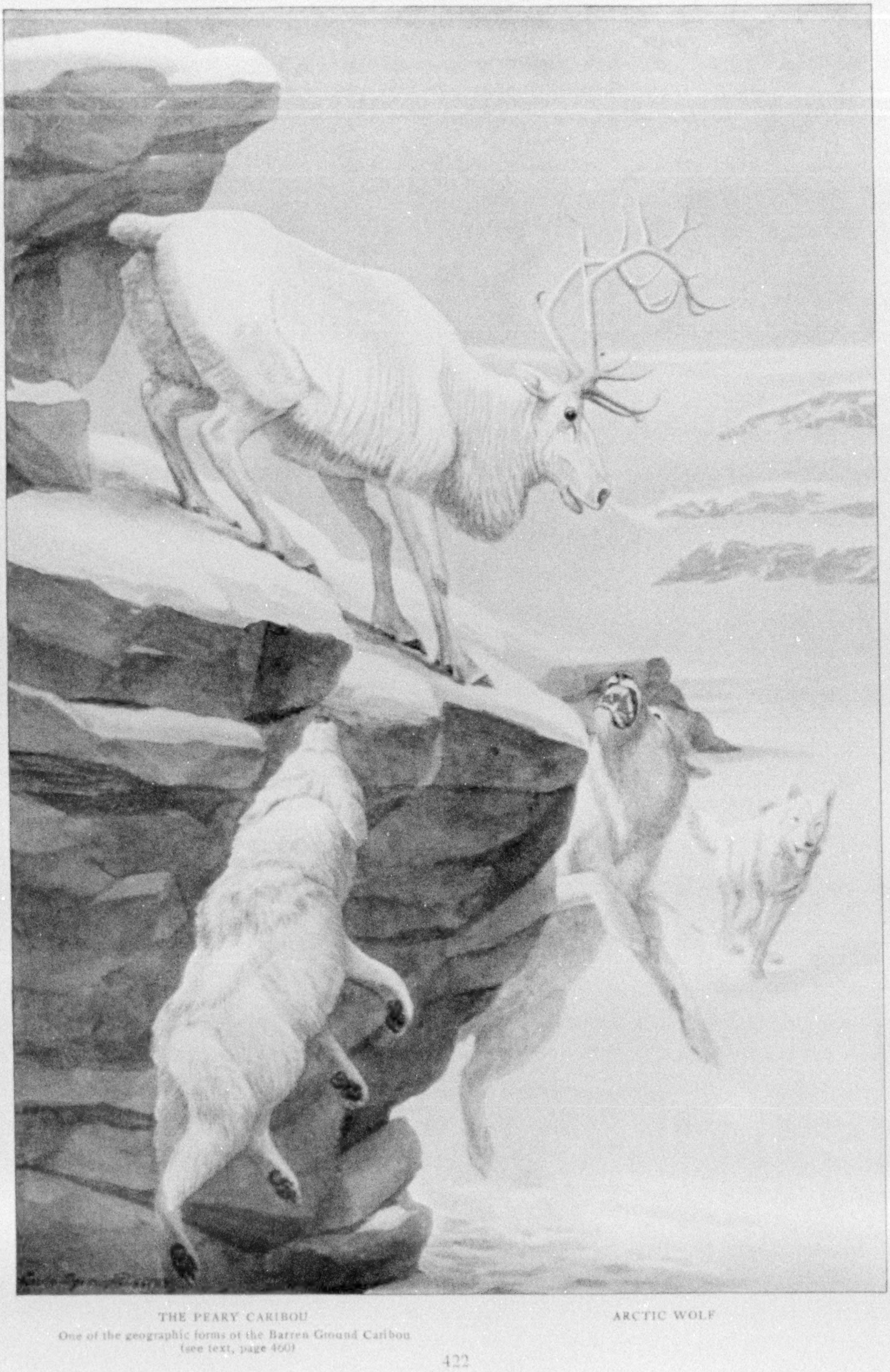
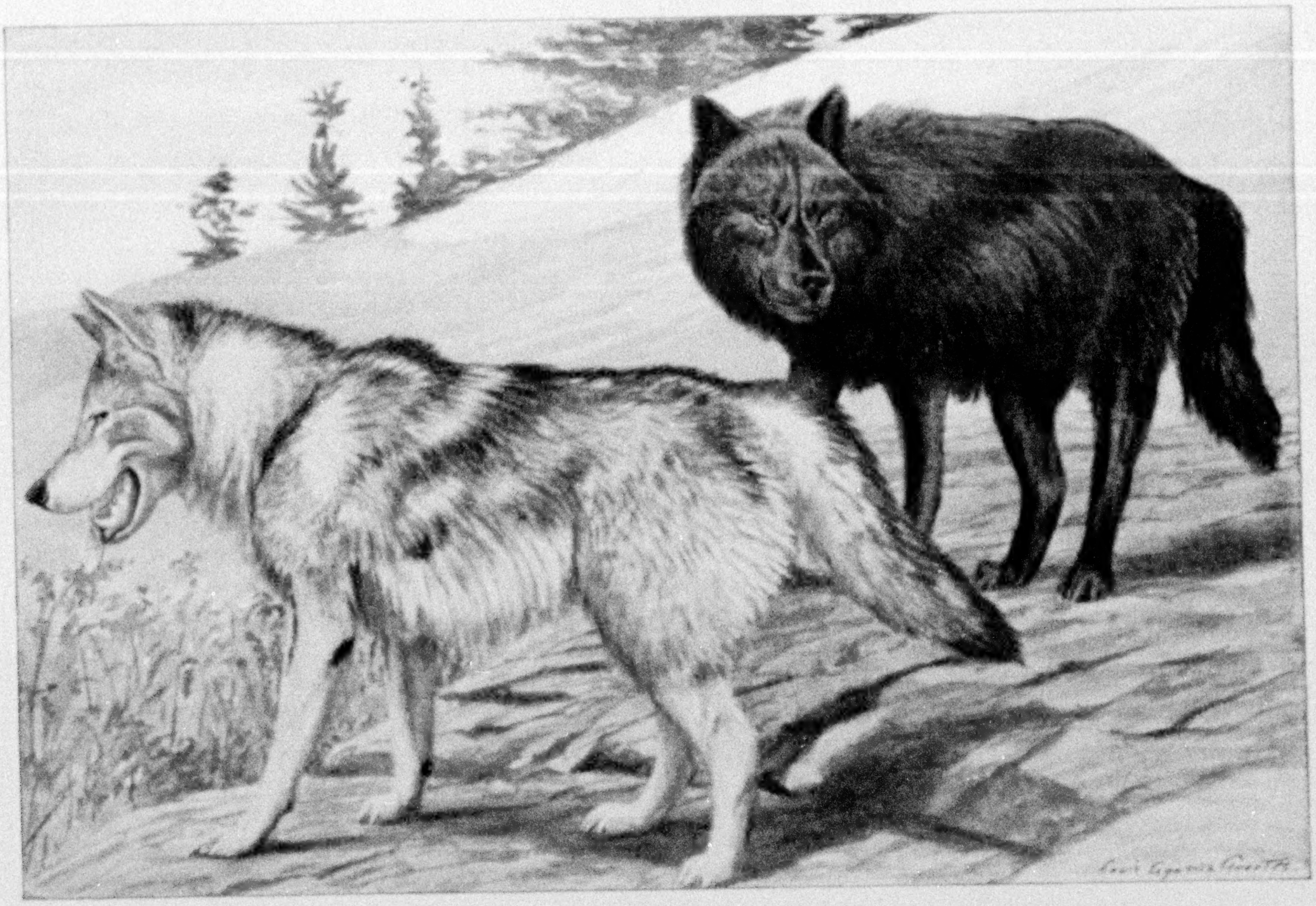


THE PEARY CARIBOU

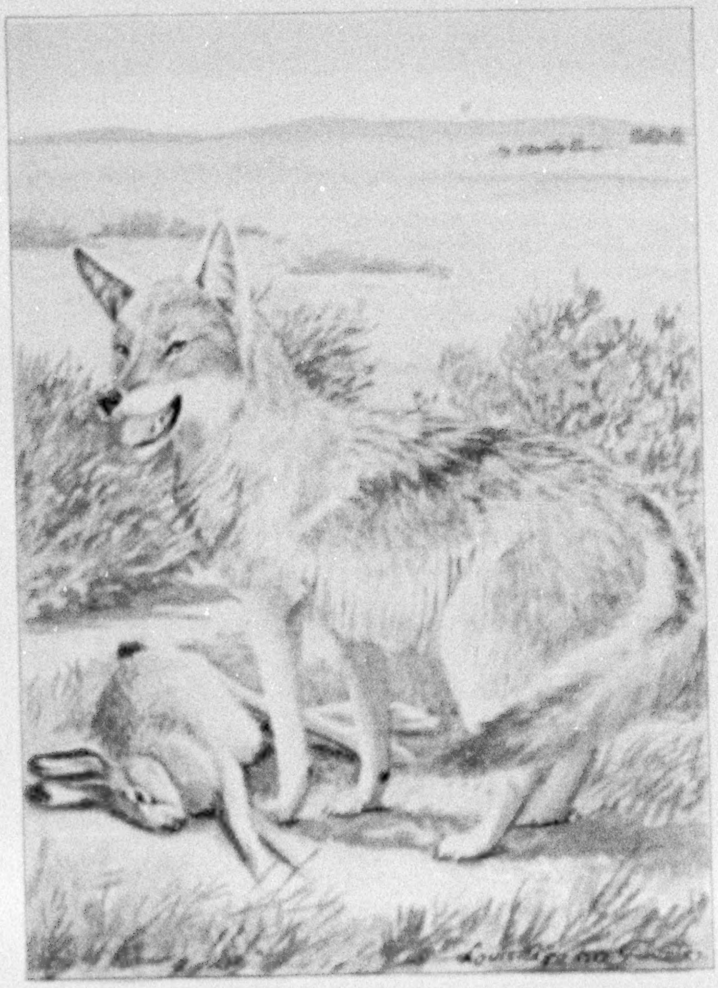
One of the geographic forms of the Barren Ground Caribou (see text, page 460)

ARCTIC WOLF

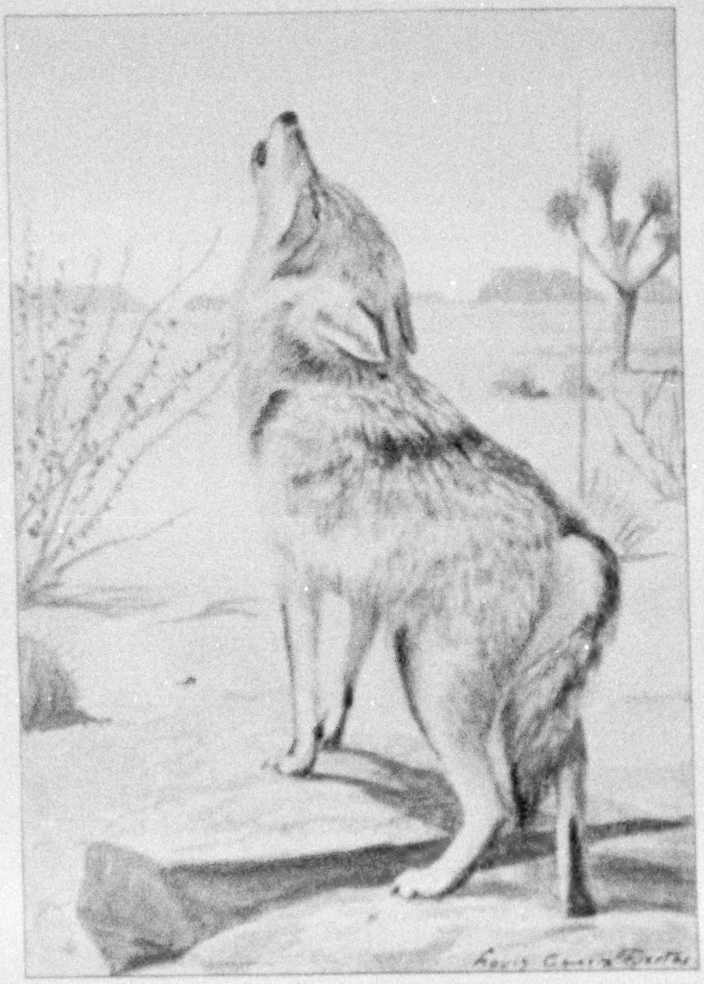


GRAY, OR TIMBER, WOLF

BLACK WOLF



PLAINS COYOTE, OR PRAIRIE WOLF



ARIZONA, OR MEARNS, COYOTE

necessity for action of this kind is shown by the recent capture in Colorado of a huge old dog wolf with a definite record of having killed about $3,000 worth of stock. Interesting as wolves are, filling their place in the wilderness, their habits bar them from being tolerated in civilized regions.

PLAINS COYOTE, OR PRAIRIE WOLF
(Canis latrans)

Western North America is inhabited by a peculiar group of small wolves, known as coyotes, this being a Spanish corruption of the Aztec name *coyotl*. They range from northern Michigan, northern Alberta, and British Columbia south to Costa Rica, and from western Iowa and Texas to the Pacific coast. As a group they are animals of the open plains and sparsely wooded districts, ranging from sea-level to above timber-line on the highest mountains. They are most at home on the wide brushy or grassy plains of the western United States and the table-lands of Mexico.

Within their great area coyotes have developed several distinct species and a number of geographic races, distinguished by differences in size, color, and other characteristics. Some attain a size almost equaling that of the gray wolf, while others are much smaller.

They are less courageous and have less of the social instinct than gray wolves, and on the rare occasions when they hunt in packs they form, no doubt, a family party, including the young of the year. They appear to pair more or less permanently and commonly hunt in couples. The young, sometimes numbering as many as fourteen, are born in a burrow dug in a bank, or in a den among broken rocks and ledges. Young animals are readily tamed, and it is entirely probable that some of the dogs found by early explorers among western Indians may have descended from coyotes.

Coyotes are a familiar sight to travelers in the wildest parts of the West. Here and there one is seen trotting through the sagebrush or other scrubby growth, or stopping to gaze curiously at the intruder. If suddenly alarmed, they race away across the plains with amazing speed. At night their high-pitched, wailing howls voice the lonely spirit of waste places.

With the growth of settlement in the West and the steady decrease of large and small game, coyotes have become more and more destructive to poultry and all kinds of live stock. As a result, every man's hand is against them, reinforced by gun, trap, and poison. Despite years of this persistent warfare, their acute intelligence, aided by their extraordinary fecundity, has enabled them to hold their own over a great part of their original range. Their depredations upon live stock have been so great that many millions of dollars have been paid in bounties for their destruction.

This method of control has proved so ineffective, however, that the Federal Government has engaged in the task of suppressing them, together with the other less numerous predatory animals of the West, and has placed about 300 hunters in the field for this purpose. The complete destruction of coyotes would, no doubt, upset the balance of nature in favor of rabbits, prairie-dogs, and other harmful rodents, and thus result in a very serious increase in the destruction of crops.

The coyote supplies much interest and local color to many dreary landscapes and has become a prominent figure in the literature of the West. There it is usually symbolic of shifty cunning and fleetness of foot. Whatever his faults, the coyote is an amusing and interesting beast, and it is hoped that the day of his complete disappearance from our wild life may be far in the future.

ARIZONA, OR MEARNS, COYOTE
(Canis mearnsi)

The Arizona coyote is one of the smallest and at the same time the most handsomely colored of all its kind. Its home is limited to the arid deserts on both sides of the lower Colorado River, but mainly in southwestern Arizona and adjacent parts of Sonora. This is one of the hottest and most arid regions of the continent, and for coyotes successfully to hold their own there requires the exercise of all the acute intelligence for which they are noted. Instead of the winter blizzards and biting cold encountered in the home of the plains coyote, this southern species has to endure the furnacelike heat of summer, with occasional long periods of drought, when water-holes become dry, plant life becomes dormant, and a large part of the smaller mammal life perishes.

The Arizona coyote, like others of its kind, is omnivorous. In seasons of plenty, rabbits, kangaroo rats, pocket gophers, and many other desert rodents cost only the pleasant excitement of a short stalk. With the changing seasons the flesh diet is varied by the sugary mesquite beans, juicy cactus fruit, and other products of thorny desert plants. Wherever sufficient water is available for irrigation, small communities of Indians or Mexicans are to be found. About such centers many coyotes usually establish themselves and fatten on poultry, green corn, melons, and other fruits provided by the labor of man. Many of them also patrol the shores of the Gulf of California and feast upon the eggs of turtles and other spoils of the sea.

The arrival of men at a desert water-hole is quickly known among these alert foragers, and when the travelers arise at daybreak they are likely to see tell-tale tracks on the sand where one or two coyotes have walked in and out between their sleeping places and all about camp. Shortly afterward the campers, if inexperienced, may learn that bacon and other food are contraband and always confiscated by these dogs of the desert. These camp marauders often stand among the bushes only 75 or 100 yards away in the morning and watch the intruders with much curiosity until some hostile movement starts them off in rapid flight.

WHITE, OR ARCTIC, FOX (Alopex lagopus)

The Arctic fox, clothed in long, fluffy white fur, is an extremely handsome animal, about two-thirds the size of the common red fox. It is a circumpolar species, which in America ranges over all the barren grounds beyond the limit of trees, including the coastal belt of tundra from the Peninsula of Alaska to Bering Straits, the Arctic islands, and the frozen sea to beyond 83 degrees of latitude.

The blue fox of commerce is a color phase of this species, usually of sporadic occurrence, like the black phase of the red fox. The white fox makes its burrow either in a dry mound, under a large rock, or in the snow, where its young are brought forth and cared for with the devotion which appears to characterize all foxes.

How this small and delicately formed animal manages to sustain life under the rigorous winter conditions of the far north has always been a mystery to me. I have seen its tracks on the sea ice miles from shore. It regularly wanders far and wide over these desolate icy wastes, which can offer only the most remote chance for food. However, it appears to thrive, with other animal life, even where months of continuous night follow the long summer day.

The food of the Arctic fox includes nearly all species of the wild-fowl which each summer swarm into the far North to breed. There on the tundras congregate myriads of ducks, geese, and waders, while on the cliffs and rocky islands are countless gulls and other water birds. In winter they find lemmings and other northern mice, occasional Arctic hares, and ptarmigan, as well as fragments of prey left by Arctic wolves or polar bears. Now and then the carcass of a whale is stranded or frozen in the ice, furnishing an abundance of food, sometimes for a year or more, to the foxes which gather about it from a great distance.

Perhaps owing to its limited experience with man, the northern animal is much less suspicious than the southern red fox. During winter sledge trips in Alaska I frequently had two or three of them gather about my open camp on the coast, apparently fascinated by the little camp-fire of driftwood. They would sit about, near by in the snow, for an hour or two in the evening, every now and then uttering weak, husky barks like small dogs.

The summer of 1881, when we landed from the *Corwin* on Herald Island, northwest of Bering Straits, we found many white foxes living in burrows under large scattered rocks on the plateau summit. They had never seen men before and our presence excited their most intense interest and curiosity. One and sometimes two of them followed closely at my heels wherever I went, and when I stopped to make notes or look about, sat down and watched me with absurd gravity. Now and then one at a distance would mount a rock to get a better view of the stranger.

On returning to the ship, I remembered that my notebook had been left on a large rock over a fox den, on the island, and at once went back for it. I had been gone only a short time, but no trace of the book could be found on or about the rock, and it was evident that the owner of the den had confiscated it. Several other foxes sat about viewing my search with interest and when I left followed me to the edge of the island. A nearly grown young one kept on the *Corwin* was extraordinarily intelligent, inquisitive, and mischievous, and afforded all of us much amusement and occasional exasperation.

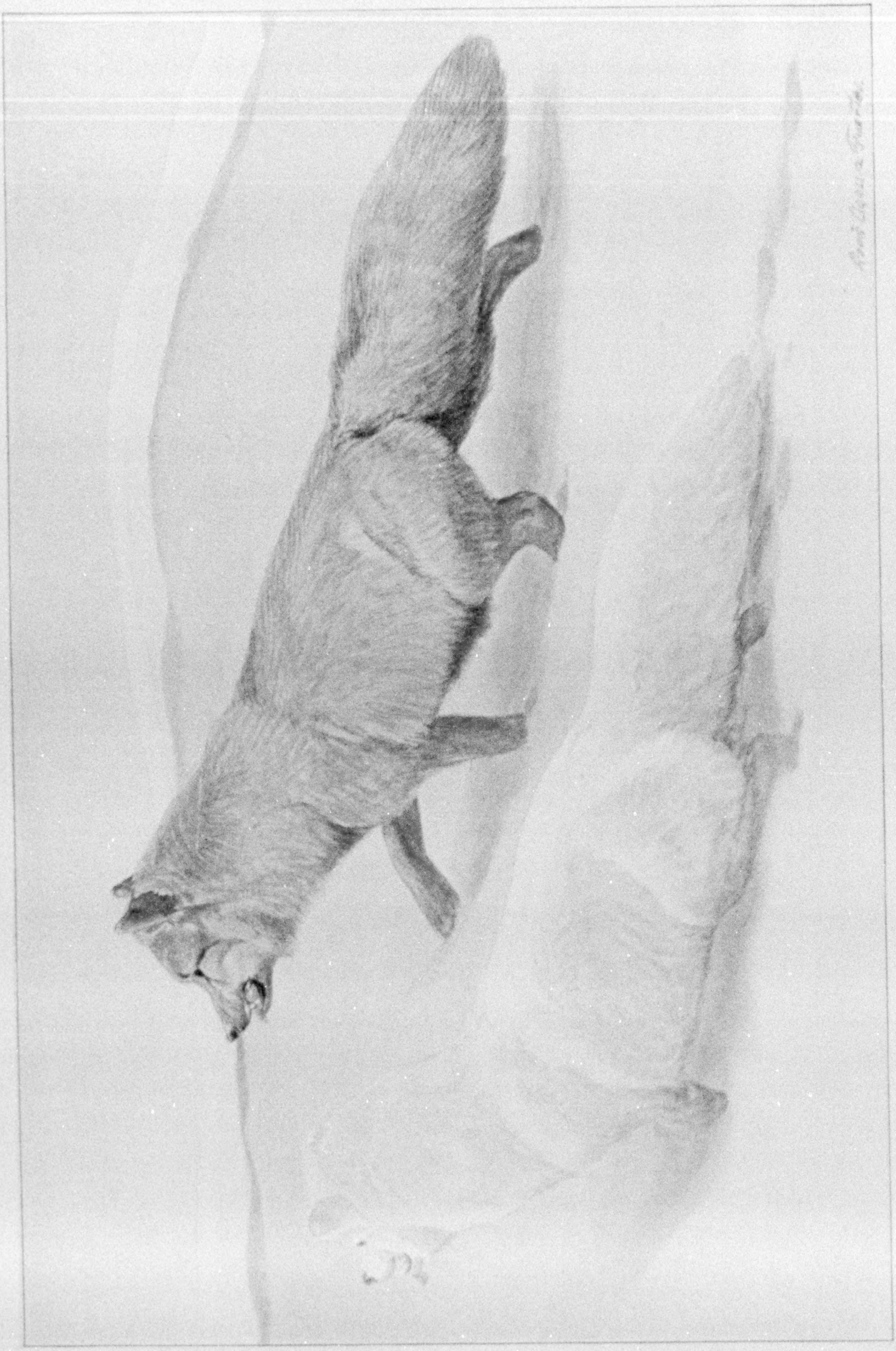
PRIBILOF BLUE FOX (Alopex lagopus pribilofensis)

The blue fox is a color phase of the Arctic white fox and may occur anywhere in the range of the typical animal. In fact, the blue phase bears the same relationship to the white that the black phase does to the red fox. In the Pribilof, or Fur Seal, Islands of Alaska, however, through the influence of favorable climatic conditions, assisted by artificial selection in weeding out white animals, the blue phase has become the resident form. Isolation on these islands has developed other characters also which, with the prevailing color, render the Pribilof animal a distinct geographic race of the white species. A blue fox is also the prevailing resident animal in Iceland.

In years when fur-seals were killed in considerable numbers on the Pribilofs their carcasses remained on the killing grounds as a never-failing store of food through the winter. During summer there is an abundance of nesting water-fowl, and throughout the year there are mice on land and the products of the sea along shore. As a result the foxes have thrived amazingly and several hundred skins have been produced a year. With the lessening number of seals now being killed on the islands and the resulting scarcity of winter food, the fate of the foxes is somewhat in doubt. The Pribilof skins are of high market value, bringing from $40 to $150 each in the London market.

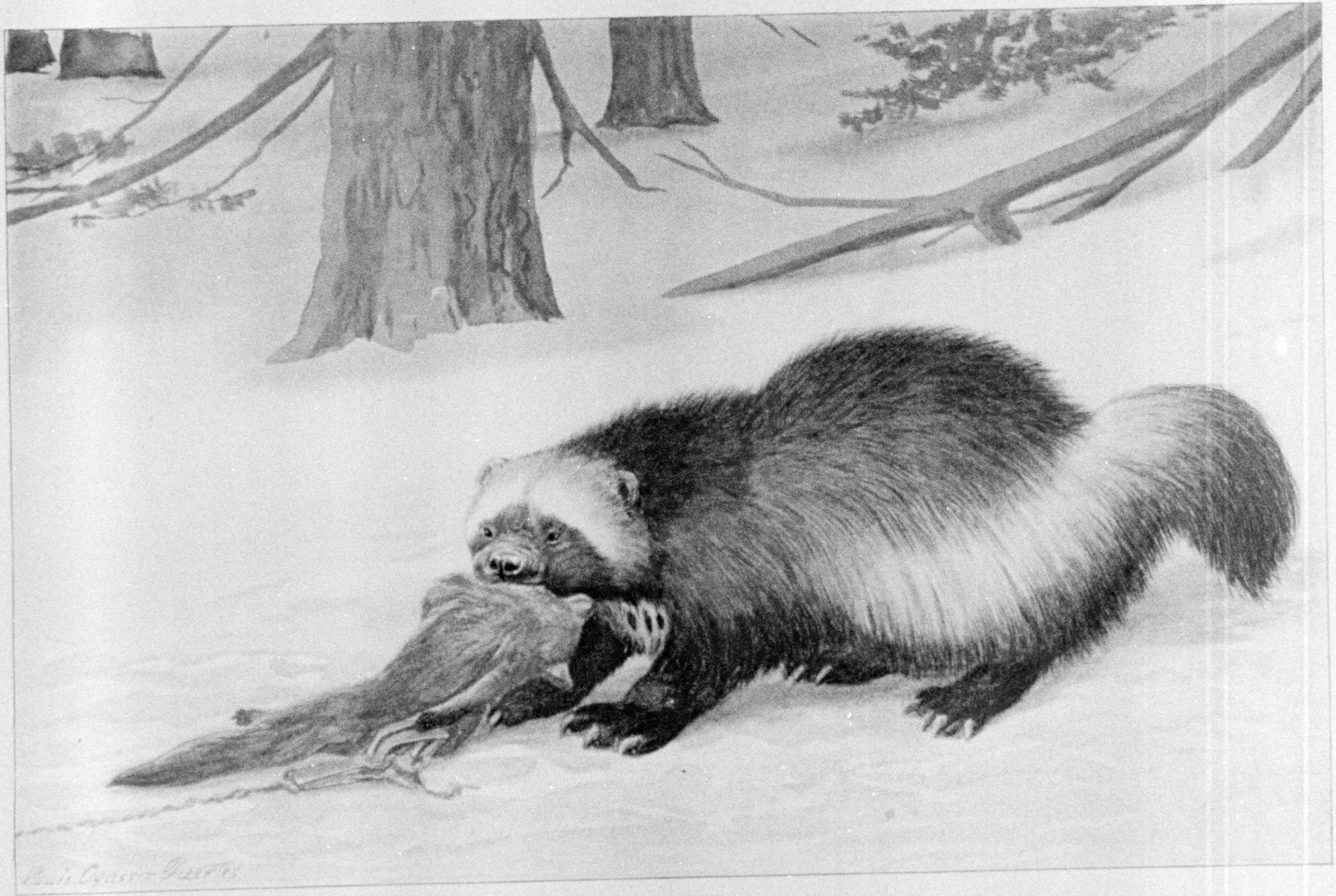
Stock from the Pribilofs has been introduced on a number of the Aleutians and other Alaskan islands for fur-farming purposes. The value of these fur-bearers is so great that special effort should be made not only to keep up the stock on the islands, but still further to improve it.

The Pribilof foxes have from five to eleven young, which are usually born above ground and are later carried to the shelter of dens dug in the open or under the shelter of a rock. Foxes have become so accustomed to people on these islands that they have little fear and come about boldly to satisfy their curiosity or to seek for food. They often show an amusing interest in the doings of any one who invades the more remote parts of their domain. White animals born on the islands or coming in by chance when the pack ice touches there in winter are killed, whenever possible, in order to hold the blue strain true.



WHITE, OR ARCTIC, FOX

PRIBILOF BLUE FOX


Louis Agassiz Fuertes

WOLVERINE

WOLVERINE (Gulo luscus)

The wolverine, or carcajou of the Canadian voyageurs, is a circumpolar species belonging to the northern forested areas of both continents. In North America it formerly ranged from the northern limit of trees south to New England and New York, and down the Rocky Mountains to Colorado, and down the Sierra Nevada to near Mount Whitney, California. It is a low, squat, heavy-bodied animal, with strong legs and feet armed with sharp claws, and is the largest and most formidable of the weasel family.

The wolverine is extraordinarily powerful and possesses what at times appears to be a diabolical cunning and persistence. It frequently trails trappers along their trap lines, eating or destroying their catches and at times hiding their traps. It is a tireless wanderer, and the hunter or traveler in the northern wilds always has this marauder in mind and is put to the limit of his wits to provide caches for his provisions or other supplies which it can not despoil.

What it can not eat it is likely to carry away and hide. A wolverine has often been known to expend a surprising amount of labor in apparently deliberate mischief, even carrying numerous articles away from camps and hiding them in different places. It sometimes trails a traveler for many miles through winter snow, always out of sight, but alert to take advantage of any carelessness in leaving game or other food unguarded.

Mingled with these mischievous traits the wolverine possesses a savage ferocity combined with a muscular power which renders it a dreaded foe of all but the largest animals of its domain. When guarding her young, the female is no mean foe, even for a man.

As a consequence of its mental and physical character, the wolverine, more than any other animal of the north, has impressed itself on the imagination of both native and white hunters and travelers. A vast amount of folk-lore has grown up about it and both Indians and Eskimos make offerings to propitiate its malignant spirit. The Alaskan Eskimos trim the hoods of their fur garments with a strip of wolverine fur, and Eskimo hunters wear belts and hunting bags made of the skin of the legs and head, that they may acquire some of the power of the animal from which these came.

The value of the handsome brown fur of the wolverine, as well as the enmity the animal earns among hunters and trappers, has resulted in its being so persistently hunted that it has become extinct over much of its former territory, and wherever still found it is much reduced in numbers.

PACIFIC WALRUS (Odobenus obesus)

The walruses, or "sea horses" of the old navigators, are the strangest and most grotesque of all sea mammals. Their large, rugged heads, armed with two long ivory tusks, and their huge swollen bodies, covered with hairless, wrinkled, and warty skin, gives them a formidable appearance unlike that of any other mammal. They are much larger than most seals, the old males weighing from 2,000 to 3,000 pounds and the females about two-thirds as much.

These strange beasts are confined to the Arctic Ocean and the adjacent coasts and islands and are most numerous about the borders of the pack ice. Two species are known, one belonging to the Greenland seas, while the other, the Pacific walrus, is limited to Bering Sea and the Arctic basin beyond Bering Straits.

The Pacific walruses migrate southward through Bering Straits with the pack ice in fall and spend the winter in Bering Sea and along the adjacent coast of eastern Asia. In spring they return northward through the straits and pass the breeding season about the ice pack, where they congregate in great herds. One night in July, 1881, the U. S. steamer *Corwin* cruised for hours along the edge of the ice pack off the Arctic coast of Alaska and we saw an almost unbroken line of walruses hauled out on the ice, forming an extended herd which must have contained tens of thousands.

Walruses were formerly very abundant in Bering Sea, especially about the Fur Seal Islands and along the coast north of the Peninsula of Alaska, but few now survive there. Owing to the value of their thick skins, blubber, and ivory tusks, they have been subjected to remorseless pursuit since the early Russian occupation of their territory and have, as a result, become extinct in parts of their former range and the species is now in serious danger of extermination.

Like many of the seals, walruses have a strong social instinct, and although usually seen in herds they are not polygamous. They feed mainly on clams or other shellfish, which they gather on the bottom of the shallow sea. On shore or on the ice they move slowly and with much difficulty, but in the water they are thoroughly at home and good swimmers. When hauled out on land or ice, they usually lie in groups one against the other. They are stupid beasts and hunters have no difficulty in killing them with rifles at close range.

Walruses have a strongly developed maternal instinct and show great devotion and disregard of their own safety in defending the young. The Eskimos at Cape Vancouver, Bering Sea, hunt them in frail skin-covered kyaks, using ivory- or bone- pointed spears and sealskin floats. Several hunters told me of exciting and dangerous encounters they had experienced with mother walruses. If the young are attacked, or even approached, the mother does not hesitate to charge furiously. The hunters confess that on such occasions there is no option but to paddle for their lives. Occasionally an old walrus is unusually vindictive and, after forcing a hunter to take refuge on the ice, will remain patrolling the vicinity for a long time, roaring and menacing the object of her anger.

When boats approach the edge of the ice where walruses are hauled up, the animals plunge into the sea in a panic and rise all about the intruders, bellowing and rushing about, rearing their huge heads and gleaming white tusks high out of water in an alarming manner. As a rule, however, they are timid and seek only to escape, although occasionally, in their excitement, one has been known to attack a boat and by a single blow of its tusks to do serious damage and endanger the crew.

ALASKA FUR SEAL (Callorhinus alascanus)

Several species of fur seals are known, all of them limited to the southern oceans or the coasts and islands of the North Pacific. All are strongly gregarious and formerly sought their island breeding grounds in vast numbers. At one period, soon after the purchase of Alaska, it was estimated that several million fur seals were on the Pribilof Islands in one season. During the height of their abundance the southern fur seals were equally numerous.

The value of their skins and the facility with which these animals may be slaughtered have resulted in the practical extermination of all but those which breed under governmental protection on the Russian islands off the coast of Kamchatka and on the Pribilof Islands in Alaska. Owing mainly to wasteful pelagic sealing prior to the recent international treaty, the numbers on both these groups of islands were much reduced.

The Alaska fur seal is a migratory species, wintering down the Pacific coast as far as northern California. The migrations of these seals are of remarkable interest. In spring they leave the northwest coast and many of them travel steadily across more than two thousand miles of the North Pacific. For days at a time they swim through a roaring gale-swept sea, under dense, low-hanging clouds, and with unerring certainty strike certain passages in the Aleutian Islands, through which they press to their breeding grounds, more than 100 miles beyond, on the small, fog-hidden Pribilof Islands.

Fur seals are extremely polygamous and the old males, which weigh from 400 to 500 pounds, "haul up" first on the breeding beaches. Each bull holds a certain area, and as the females, only one-fifth his size, come ashore they are appropriated by the nearest bulls until each "beach master" gathers a harem, sometimes containing more than 100 members.

Here the young are born, and after the mating season the seals, which have remained ashore without food from four to six weeks, return to the water. The mothers go and come, and each is able to find her young with certainty among thousands of apparently identical woolly black "pups."

From the ages of one to four years fur seals are extremely playful. They are marvelous swimmers and frolic about in pursuit of one another, now diving deep and then, one after the other, suddenly leaping high above the surface in graceful curves, like porpoises. Squids and fish of various species are their main food. Their chief natural enemy is the killer whale, which follows their migrations and haunts the sea about their breeding grounds, taking heavy toll among them.

Since the discovery of the Pribilof Islands by the Russians the fur seal herds there have yielded more than five million recorded skins. A census of the herds in 1914 gave these islands nearly three hundred thousand seals. Now that pelagic sealing has been suppressed and the herds are being protected, there is every reason to expect that the seals will increase rapidly to something like their former numbers.

STELLER SEA-LION (Eumetopias jubata)

Sea-lions are near relatives of the fur seals and have a nearly similar distribution, both in far southern and northern seas. The males of the several species are more than twice the size of the females and are characterized by an enormous development of neck and shoulders. The Steller sea-lion is the largest member of the group, the old bulls weighing from 1,200 to 1,500 pounds. All are extremely gregarious and polygamous.

The Steller sea-lions belong to the North Pacific, whence they range in winter as far south as the coasts of California and Japan. In spring they migrate northward to their breeding grounds among the Aleutian, Pribilof, and other rocky islands of the North Pacific. The early histories of this region record their great abundance, including several hundred thousand which were reported to have congregated to breed each season on the Pribilof Islands. Although less valuable than the fur-seal, persistent hunting has gradually reduced their numbers on these islands until in 1914 only a few hundred remained.

In summer range they are less limited than the fur seals, occurring in herds about the shores of many rocky islands along the mainland coast of the North Pacific and the Aleutian chain.

Since the primitive days before the arrival of civilized men in their haunts, sea-lions were of the greatest economic importance to the Aleutian Islanders and other coast natives. Food and fuel were obtained from their flesh and blubber; coverings for boats were made of their skins; water-proof overshirts of their intestines; boot soles from the tanned skin of their flippers; trimmings of fancy garments from their tanned gullets and bristles, and thread from their sinews.

They are preëminently animals of the most rugged of shorelines and the stormiest of seas, being superbly powerful beasts with extraordinary vitality. The ease with which they pass through a smother of pounding seas to mount their rugged resting places is an admirable exhibition of skill and strength. The males have a bellowing roar, which rises continually from the herds on the rocks in savage unison with the booming of the sea against the base of their refuge.

The harems of the bulls on Pribilof Islands rarely exceed a dozen members, which are

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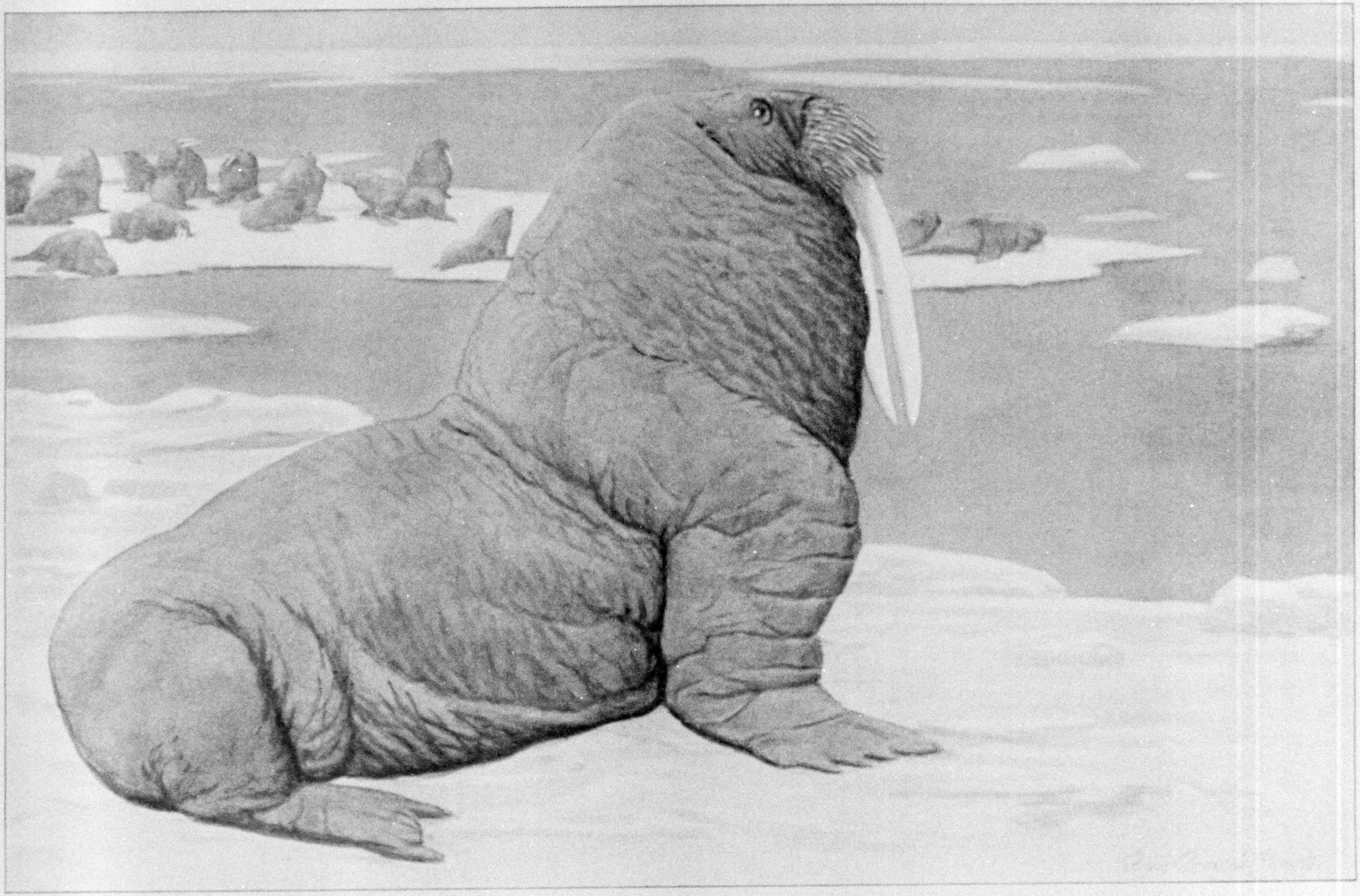
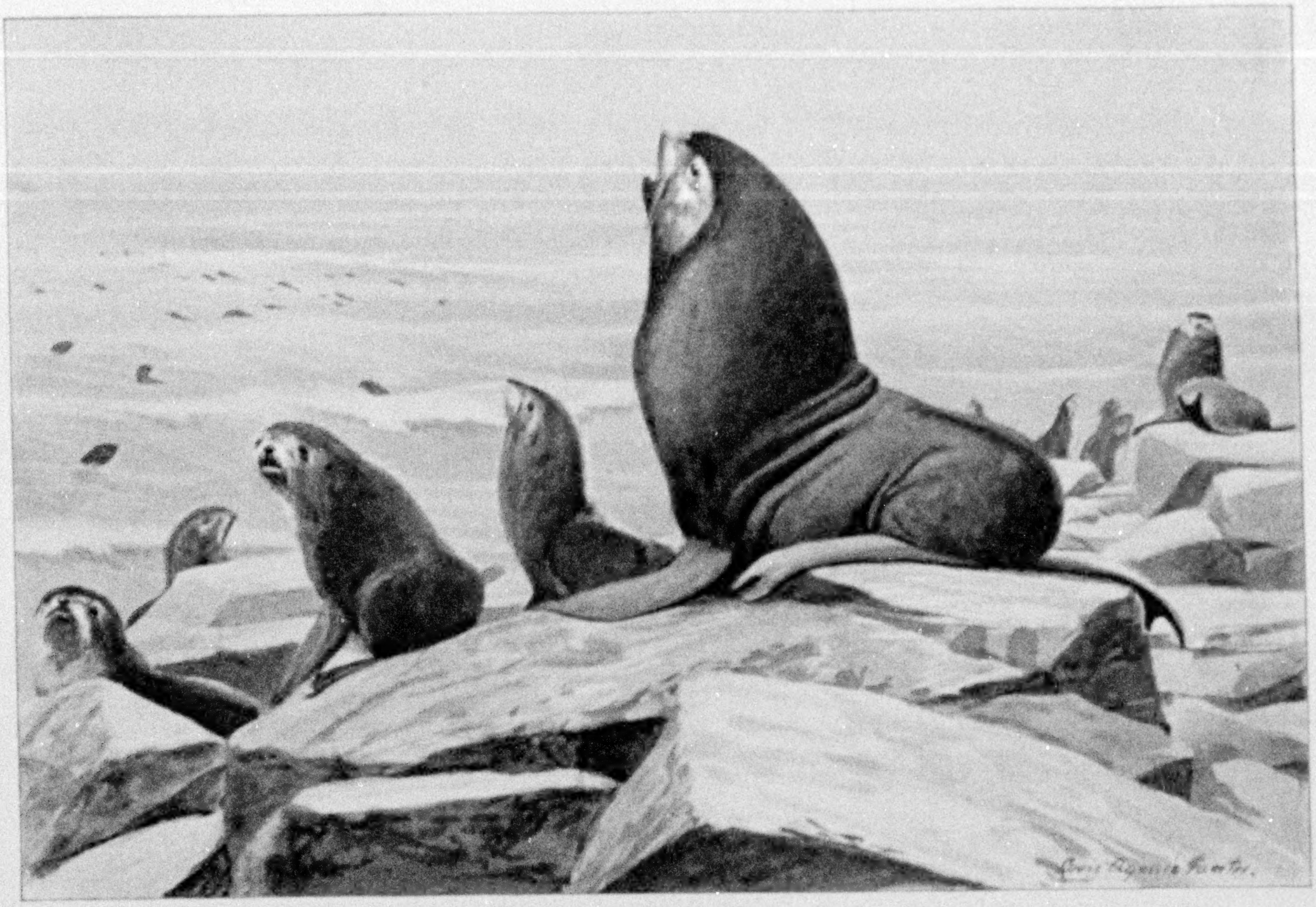
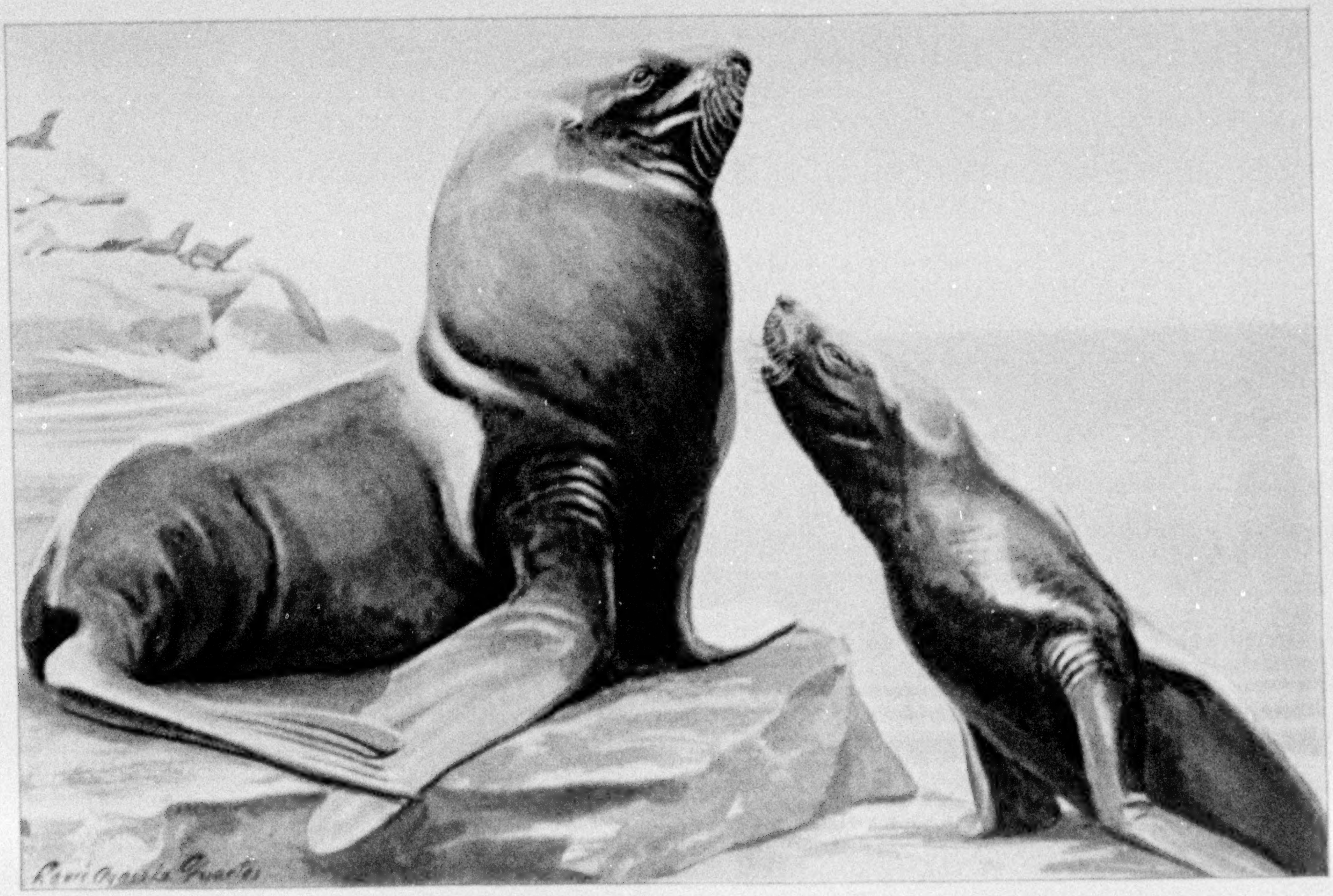


PACIFIC WALRUS



ALASKA FUR SEAL



STELLER SEA-LION

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under less strict discipline than the harems of the fur seals. The old bulls, especially during the mating season, are aggressive and savage fighters, inflicting severe wounds on one another. At all times they are more courageous and belligerent than fur seals, and hunters driving parties of them back from the beach on the Pribilofs approach them with extreme caution, to avoid the dangerous charges of angry bulls. It is reported that an umbrella opened and closed suddenly in the faces of the old sea-lions appears to terrify them more than any other weapon and is used successfully in drives. At sea they have only a single known enemy to fear—the fierce killer whale.

SEA OTTER (Latax lutris and its subspecies)

Sea otters, distant relatives of land otters, are heavy-bodied animals, about 4 feet long, with broad webbed hind feet. When in the water they have a general resemblance to seals, whose mode of life is similar to theirs. Their fur is extremely dense and on the skins of adult males is almost black, closely sprinkled with long white-tipped hairs. The fur of prime skins has a silky luster, equaled in beauty by only the finest silver-tipped fox skins. For centuries sea-otter fur has been highly prized and single skins have brought more than $1,000 in the London market.

Otters are limited to the coasts of the North Pacific, where formerly they were incredibly abundant all the way from the shores and islands of Lower California to the Aleutians, and thence along the Asiatic coast to the Kuriles. Through excessive hunting, they are now extinct along most of this extended coastline.

In the days of the Russian occupation of Alaska the discovery of the abundance of sea otters led to intense activity in their pursuit. Otter-hunting expeditions were organized by the Russians along the storm-swept coast from Unalaska to Sitka, sailing vessels being used as convoys for hundreds of Aleut hunters in their skin-covered boats. The loss of life among the hunters under their brutal taskmasters was appalling and resulted in seriously and permanently reducing the native population of the Aleutian Islands. At the same time enormous numbers of sea-otter skins were taken. Afterward both English and American ships engaged in the pursuit of otters farther down the coast.

The first year after the discovery of the Pribilof Islands the records show that 5,000 sea otters were taken there. Many expeditions in other directions secured from one to several thousand skins. When sea otters were most abundant they were found all down the coast, even in San Francisco Bay, and one American trading vessel obtained 7,000 skins in a few weeks from the natives of the northern coast of Lower California.

The otters formerly frequented the shores of rocky islands and outlying reefs, but constant persecution has driven the few survivors to remain almost constantly at sea, where they seek resting places among kelp beds. They are now excessively shy and, aided by keen eyes and an acute sense of smell, are difficult to approach. When anything excites their curiosity they commonly raise the body upright, the head high above water, and gaze steadily at the object. If alarmed, they dive and reappear at a long distance.

Otter hunters report the animals very playful in pleasant weather, and sometimes floating on their backs and playing with pieces of kelp. The mother is devoted to her young and is said to play with it in the water for hours at a time.

All efforts to rear the young in captivity have failed. The food of the sea otter is mainly of shellfish of various kinds, secured by them from the bottom of the sea.

Practically the only sea otters left among the hordes which once frequented the American shores of the North Pacific are now scattered along the Aleutian Islands. Government regulations prohibit their being hunted and it is hoped that enough still remain to restock the wild and stormy sea where they have their home.

NORTHERN SEA-ELEPHANT, OR ELEPHANT SEAL (Mirounga augustirostris)

Sea-elephants are the largest and among the most remarkable of the seals. Two species are known—one from islands on the borders of the Antarctic Ocean and the other from the Pacific coast of Upper and Lower California. The northern species formerly existed in vast numbers along the coast and among outlying islands from Point Reyes, north of San Francisco, south to Cedros Island, but is now reduced to a single small herd living about Guadalupe Island, off Lower California.

The old males attain a length of 22 feet or more and are huge, ungainly beasts, moving with difficulty on land, but with ease and grace in the water. The name sea-elephant is obviously derived from the broad flexible snout of the males, which, when relaxed, hangs 6 or 8 inches below the muzzle. This curious proboscis can be moved about and raised vertically, giving the animal a strange appearance. The males have a loud roar like the bellowing of an ox.

The breeding season extends from February to June, and during this period these seals are far more numerous on shore than at any other time. They are gregarious in habits and formerly hauled up in herds on the islands or on remote and inaccessible beaches of the mainland. On shore they are sluggish, having none of the alertness shown by many other seals. They lie supine on the sand and permit a man to walk quietly up and touch them without showing signs of fear. When attacked by sealers or otherwise alarmed, however, they become panic-stricken and make ungainly efforts to escape, but quickly become exhausted by the exertion necessary to move their great bodies. Their only natural enemy appears to be the killer whale.

Between 1855 and 1870 the great numbers of northern sea-elephants, combined with their helplessness on shore and the value of their oil, attracted numerous sealing and whaling ships to the coast of Lower California. The resulting slaughter reduced these animals from swarming abundance to a few scattered herds. Since then their numbers have steadily decreased, and there is a serious probability that these strange and interesting habitants of the sea will soon disappear forever.

The small remaining herd on Guadalupe Island is without protection and lies at the mercy of wanton hunters. The people of the coastal towns of California should exert themselves to discourage hunters from killing these seals, since the only hope for the preservation of this noteworthy species lies in an awakened public sentiment in its favor. Even within recent years they have occasionally visited the Santa Barbara Islands, California, and if the existing survivors can be saved they may again become resident there.

HARBOR SEAL, OR LEOPARD SEAL (Phoca vitulina)

The harbor seal, one of the smallest of the hair seals, attaining a length of only 5 or 6 feet, is one of the most widely distributed and best known of its kind. It is a circumpolar species, formerly ranging well south on the European coast and to the Carolinas on the American side of the Atlantic, though now more restricted in its southern extension. On the North Pacific it ranges south to the coast of Japan on the Asiatic side and to Lower California on the American side.

Throughout its range the harbor seal haunts the coast-line, frequenting rocky points, islets, bays, harbors, and the lower courses of rivers. It commonly frequents the sandy bars exposed at low tide about the mouths of rivers, and has been known to ascend the St. Lawrence to Lake Champlain and Lake Ontario, and the Yukon to several hundred miles above its mouth. It is still a common and well-known animal on the coast of Maine and eastern Canada and about many harbors on the Pacific coast. It appears to be a non-migratory species and in northern waters frequents the pack ice along shore in winter. Where the pack is unbroken, the seal makes breathing holes through the ice, which it visits at intervals, and where it is hunted by the Eskimos.

It is not polygamous and is not so strongly gregarious as some of the other seals. That it has some social instinct is evident, however, since it commonly gathers in small herds on the same sand spits, rocky points, and islets. The young are born in early spring and at first are entirely covered with a woolly white coat. The mother is devoted to the "pup" and shows the deepest anxiety if danger threatens.

The flesh and blubber of this seal are highly prized by the Eskimos as the most palatable of all the seals, and the skin is valued for clothing and for making strong rawhide lines used for nets and other purposes. On the Alaskan coast of Bering Sea in fall the Eskimos capture many seals in nets set off rocky points, just as gill nets are set in the same places in spring for salmon.

Owing to the presence of this seal along so many inhabited coasts, much has been written concerning its habits, especially as observed about the shores of the British Isles. Where not disturbed it shows little fear and will swim about boats or ships, raising its head high out of water and gazing steadily with large intelligent eyes at the object of its curiosity; but when hunted it becomes exceedingly shy and wary. All who have held the harbor seal in captivity agree in praising its intelligence. It becomes very docile, often learning a variety of amusing tricks, and develops great affection for its keeper.

The small size of this seal and its limited numbers are elements which save it from extensive commercial hunting and may preserve it far into the future to add life and interest to many a rocky coast.

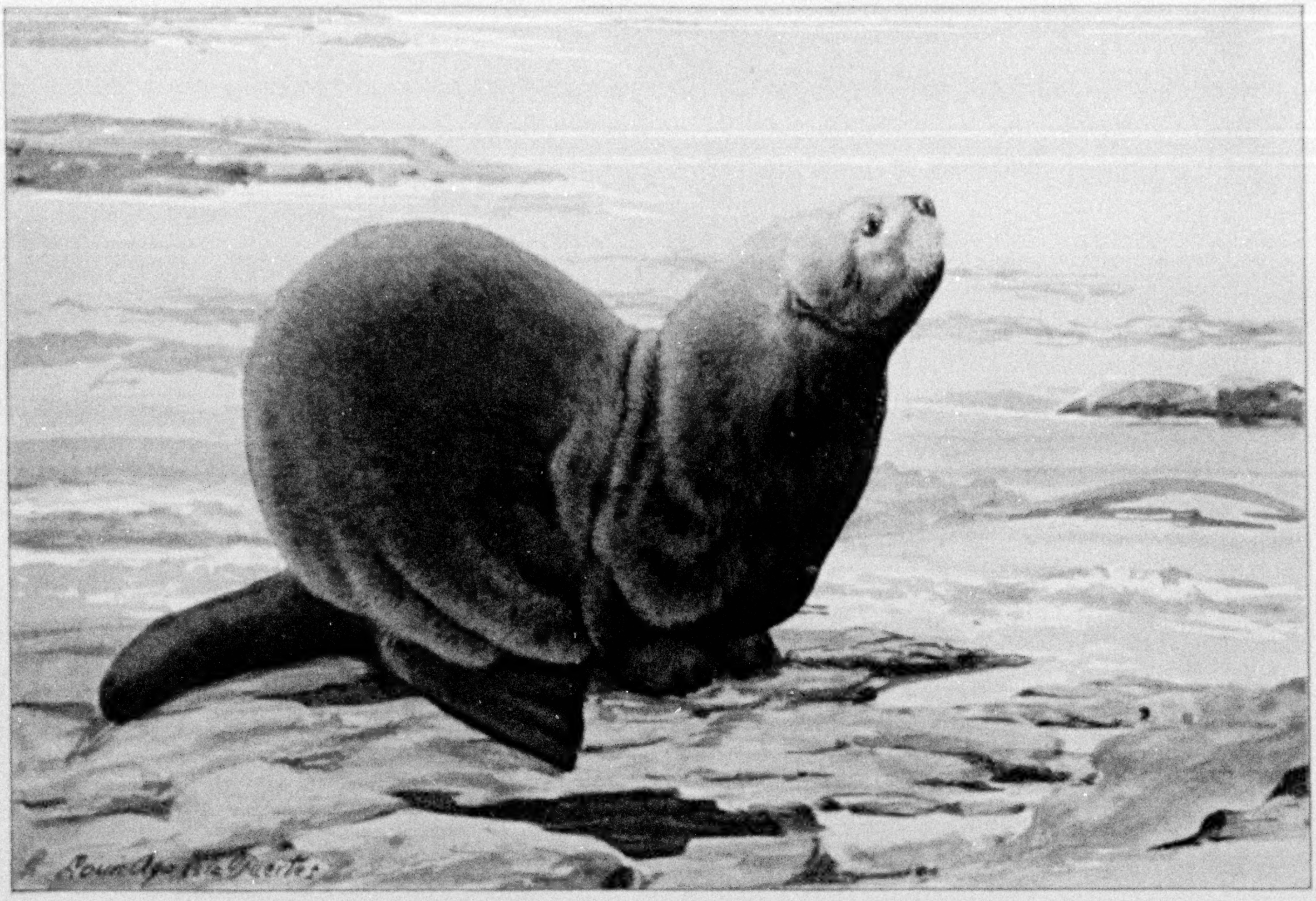
HARP SEAL, SADDLE-BACK, OR GREENLAND SEAL (Phoca grœnlandica)

The black head, gray body, and large dorsal ring of the male harp seal are strongly distinctive markings in a group generally characterized by plain dull colors. The harp seal is a large species, the old males weighing from 600 to 800 pounds.

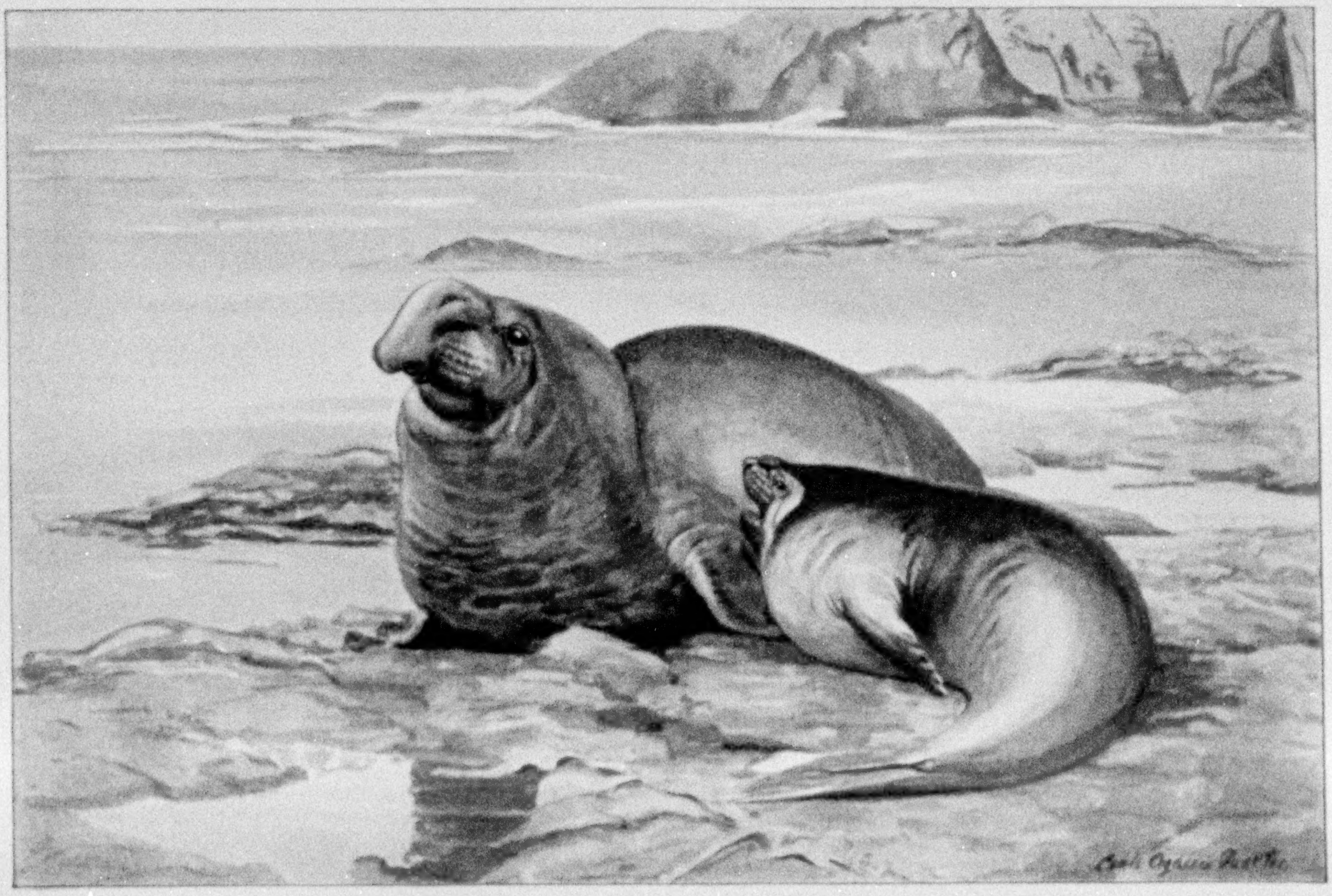
It is nearly circumpolar in distribution, but its area of greatest abundance extends from the Gulf of St. Lawrence to Greenland, and thence eastward in that part of the Arctic Ocean lying north of Europe and western Siberia. Its reported presence in the Arctic basin north of Bering Straits or along the coasts to the southward is yet to be confirmed. It is an offshore species, migrating southward with the ice pack in fall to the coast of Newfoundland and returning northward with the pack after the breeding season in spring. For a day or two during the fall migration, when these seals are passing certain points on the coast of Labrador, the sea is said to be thickly dotted with their heads as far as the eye can reach, all moving steadily southward.

The harp seal is extremely gregarious and gathers on the pack ice well offshore during March and April to breed. The main breeding grounds are off Newfoundland and off Jan Mayen Land in the Arctic. During the breeding season, in the days of their abundance, they gathered in enormous closely packed herds, sometimes containing several hundred thousand animals and covering the ice for miles.

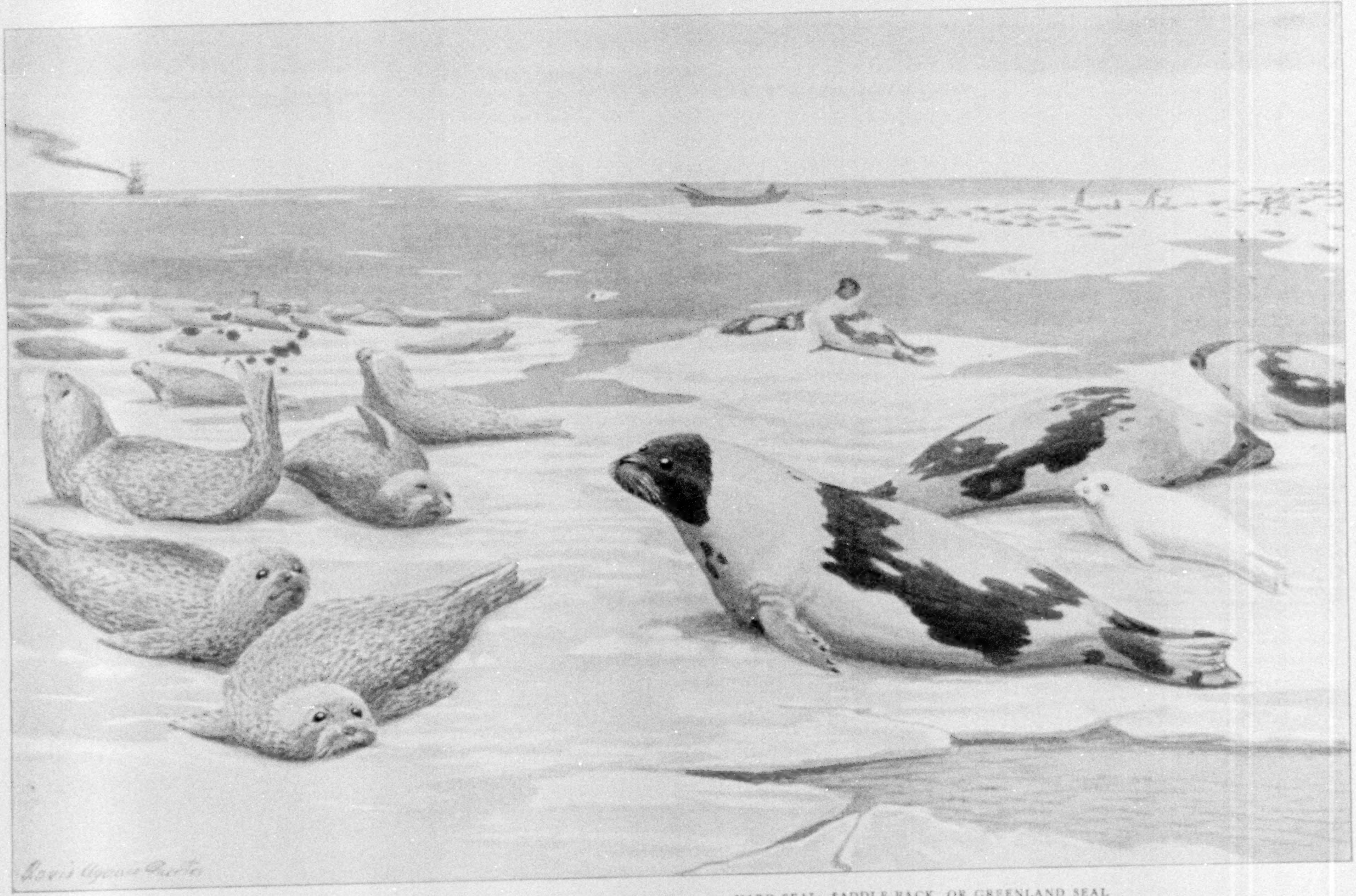
From all accounts it is evident that originally there were millions of these animals in the North Atlantic and Arctic Oceans. Their gregarious habits made them an easy prey, and the value of their skins and blubber formed



SEA OTTER



NORTHERN SEA-ELEPHANT, OR ELEPHANT SEAL


Louis Agassiz Fuertes

HARBOR SEAL, OR LEOPARD SEAL

HARP SEAL, SADDLE-BACK, OR GREENLAND SEAL the basis for a great industry. Hundreds of vessels were sent out from north European and American ports and nearly 1,000,000 harp seals were killed during each breeding season. This tremendous slaughter and its attendant waste has resulted in the disappearance of these seals from many of their former haunts and has alarmingly reduced their numbers everywhere. Some are still killed off the coast of Newfoundland, but the sealing industry, now insignificant as compared with its former estate, is practically dead.

The hunting of harp and other seals on the pack ice is an occupation calling for such splendid qualities of virile hardihood in the face of constant danger to life that its brutality has been little considered. In this perilous work great numbers of hunters have been cast away and frozen miserably on the drifting ice and many a sealing ship has been lost with all hands.

Off Newfoundland the young harp seal is born early in March, wearing a woolly white coat. At first it is tenderly cared for by its mother, but before the end of April it has learned to swim and is left to care for itself. The young do not enter the water until they are nearly two weeks old and require several days of practice before they learn to swim well. The adults are notable for their swiftness in the water. In the tremendous herds of these seals the continual cries uttered by old and young is said to produce a steady roar which may be heard for several miles. Their food is mainly fish. Man is their worst enemy, but they are also preyed upon by sharks and killer whales.

RIBBON SEAL (Phoca fasciata) (see polar bear group, page 438)

The broad-banded markings of the male ribbon seal render it the handsomest and most strongly characterized of the group of hair seals to which it belongs. Its size is about that of the harbor seal. Its range extends from the Aleutian Islands, on the coast of Alaska, and from the Kuriles, on the Asiatic shore of the Pacific, north to Bering Straits.

This seal is so scarce and its home is in such remote and little-frequented waters that its habits are almost unknown. Apparently it is even less gregarious than the harbor seal and usually occurs singly, although a few may be seen together, where individuals chance to meet. There are records of its capture at various places along the Asiatic coast, especially about Kamchatka and the shores of Okhotsk Sea. In Alaska it is a scarce visitant to the Aleutian Islands and appears to be most common on the coast south of the Yukon Delta and from Cape Nome to Bering Straits.

The few individuals taken by the Alaskan Eskimos are captured while they are hunting other seals on the pack ice in winter, and while at sea in kyaks in spring and fall. Owing to its attractive markings, the skin of the male ribbon seal is greatly prized by the Eskimos, as it was formerly by the fur traders, for use as clothes-bags. The skin is removed entire and then tanned, the only opening left being a long slit in the abdomen, which is provided with eyelet holes and a lacing string, thus making a convenient water-proof bag to use in boat or dog-sledge trips.

The scarcity of the ribbon seal and its solitary habits will serve to safeguard it from the destructive pursuit which endangers the existence of some of its relatives.

POLAR BEAR (Thalarctos maritimus)

Both summer and winter the great ice bear of the frozen north is appropriately clothed in white. It is also distinguished from all other bears by its long neck, slender pointed head, and the quantity of fur on the soles of its feet. It is a circumpolar species, the limits of whose range nearly everywhere coincide with the southern border of the pack ice. The great majority live permanently on the ice, often hundreds of miles from the nearest land.

During summer the polar bear rarely visits shore, but in winter commonly extends its wanderings to the Arctic islands and the bordering mainland coasts. In winter it ranges southward with the extension of the ice pack. In spring, by an unexpectedly sudden retreat of the ice, individual bears are often left south of their usual summer haunts, sometimes being found swimming in the open sea far off the coast of Labrador. Occasionally some of those which migrate southward with the ice through Bering Straits fail to turn north early enough and are stranded on islands in Bering Sea.

That a carnivore requiring so much food as the polar bear can maintain itself on the frozen polar sea is one of the marvels of adaptation to environment. The activity of these bears through the long black night of the far north is proved by records of Arctic explorers, whose caches have been destroyed and ships visited by them during that season. In this period of privation they range far over land and ice in search of food, and when in desperate need do not hesitate to attack men. I have seen several Eskimos who had been seriously injured in such encounters, and learned of other instances along the Arctic coast of Alaska in which hunters had been killed on the sea ice in winter. During the summer season of plenty, polar bears are mild and inoffensive, so far as men are concerned. At that time they wander over the pack ice, swimming in open leads, and, when hungry, killing a seal or young walrus.

When spring opens, many polar bears are near the Arctic coast. At that time the natives along the northeast coast of Siberia kill many of them on the ice with dogs and short-hafted, long-bladed lances. The dogs bring the bear to bay, and the hunter, watching his opportunity, runs in and thrusts the lance through its heart.

During the cruise of the *Corwin* we saw many of these bears on the broken ice off Herald and Wrangel Islands. One large old male climbed to the top of an uptilted ice-pan and, after looking about, lay down on one side and, giving a push with one hind foot, slid down head foremost 30 or 40 feet, striking the water with a great splash. He then climbed out and walked sedately away.

Another bear saw a seal basking on the ice by a large patch of open water and, swimming across, suddenly raised himself half out of the water to the edge of the ice, and by a blow of his paw crushed the seal's skull. He then climbed out and made a feast within 500 yards of where the *Corwin* was anchored to the ice pack.

Once while we were anchored in a dense fog several miles off the pack a bear came swimming out to us, stopping every now and then to raise its head high out of water to sniff the attractive odors from the ship. Although strong and tireless swimmers, these bears lack the necessary speed to capture their prey in the water.

The female retires in winter to a snug den among the hummocks on the sea ice, where one or two naked cubs are born, which by the time the ice begins to break up are ready to follow the mother. Until the cubs are well grown the mother cares for and defends them with the most reckless disregard for her own safety. On one occasion I saw a wounded mother bear shield her cub, twice the size of a Newfoundland dog, when bullets began to strike the water about them, by swimming straight away with the cub safely sheltered between her forelegs.

The inaccessible character of so large a part of the home of the polar bear will long preserve it from the extermination that is overtaking some of the land bears.

BLACK BEAR (Ursus americanus and its subspecies)

Numerous species of black bears varying in size occur in North and South America and in Asia. In North America a black bear, remarkably uniform in general appearance, but representing various geographic races and possibly species, is generally distributed throughout the forested areas from the borders of the Arctic barrens, at the northern limit of trees, south throughout the United States and down the wooded Sierra Madre to Jalisco, Mexico, and from Newfoundland on the east to Queen Charlotte Island on the west.

These bears are usually entirely black except for a brown patch covering the muzzle and an occasional white spot on the breast. Their weight is variable, the largest ones exceeding 500 pounds, but they average much less.

The cinnamon bear, so common in the West and Northwest, long supposed to be a distinct species, has proved to be merely a color phase of the black bear—cinnamon cubs being born in the same litters with black ones.

Since the days of primitive man and the great cave bear, the ways of bears have had a fearsome interest to mankind. Childhood revels in the delicious thrills of bear stories and dwells with wonder on the habit bears have of standing upright like droll caricatures of man, on the manlike tracks of their hind feet, and on their fondness for sweets and other palatable food.

From the landing of the first colonists on our shores, hunters and settlers have encountered black bears so frequently that these are among the best-known large forest animals of the continent. During winter they hibernate for months, seeking a hollow tree, a low cave, the half shelter of fallen tree trunks and brush, or else digging a den for themselves. The female chooses a specially snug den, where in midwinter from one to four cubs are born. At birth the young, only 8 or 9 inches long, are practically naked and have their eyes closed. They are so undeveloped at this time that it is more than a month before their eyes open and more than two months before they can follow their mother.

Although powerful beasts, black bears are so shy and timid that to approach them requires the greatest skill on the part of a still hunter. They only attack people when wounded or so cornered that they must defend themselves or their young. To safeguard themselves from danger they rely mainly on a fine sense of hearing and an exquisite delicacy of smell. They have poor eyesight, and where a suspicious object is seen, but no sound or scent can be noted, they sometimes rise on their hind feet and look long and carefully before retreating.

To bears in the forest everything is game. They often spend the entire day turning over stones to lick up the ants and other insects sheltered there, and at night may visit settlers' cabins and carry off pigs. They raid the settlers' cornfields for green corn and are passionately fond of honey, robbing bee trees whenever possible. In season they delight in wild cherries, blueberries, and other fruits, as well as beechnuts, acorns, and pinyon nuts. They are mainly nocturnal, but in districts where not much disturbed wander widely by day.

The success of black bears in caring for themselves is well demonstrated by the numbers which still survive in the woods of Maine, New York, and other long-settled States. Their harmlessness and their exceeding interest to all render them worthy of careful protection. They should be classed as game and thoroughly protected as such except for certain open seasons. If this is done throughout the country, as is now the case in certain States, the survival of one of our most characteristic large wild animals will be assured.

GLACIER BEAR (Ursus emmonsi)

When first discovered the glacier bear was supposed to be a distinct and well-marked species. Recently cubs representing the glacier bear and the typical black bear have been found in the same litter, thus proving it to be merely a color phase of the black bear. Its color varies exceedingly, from a light smoky,

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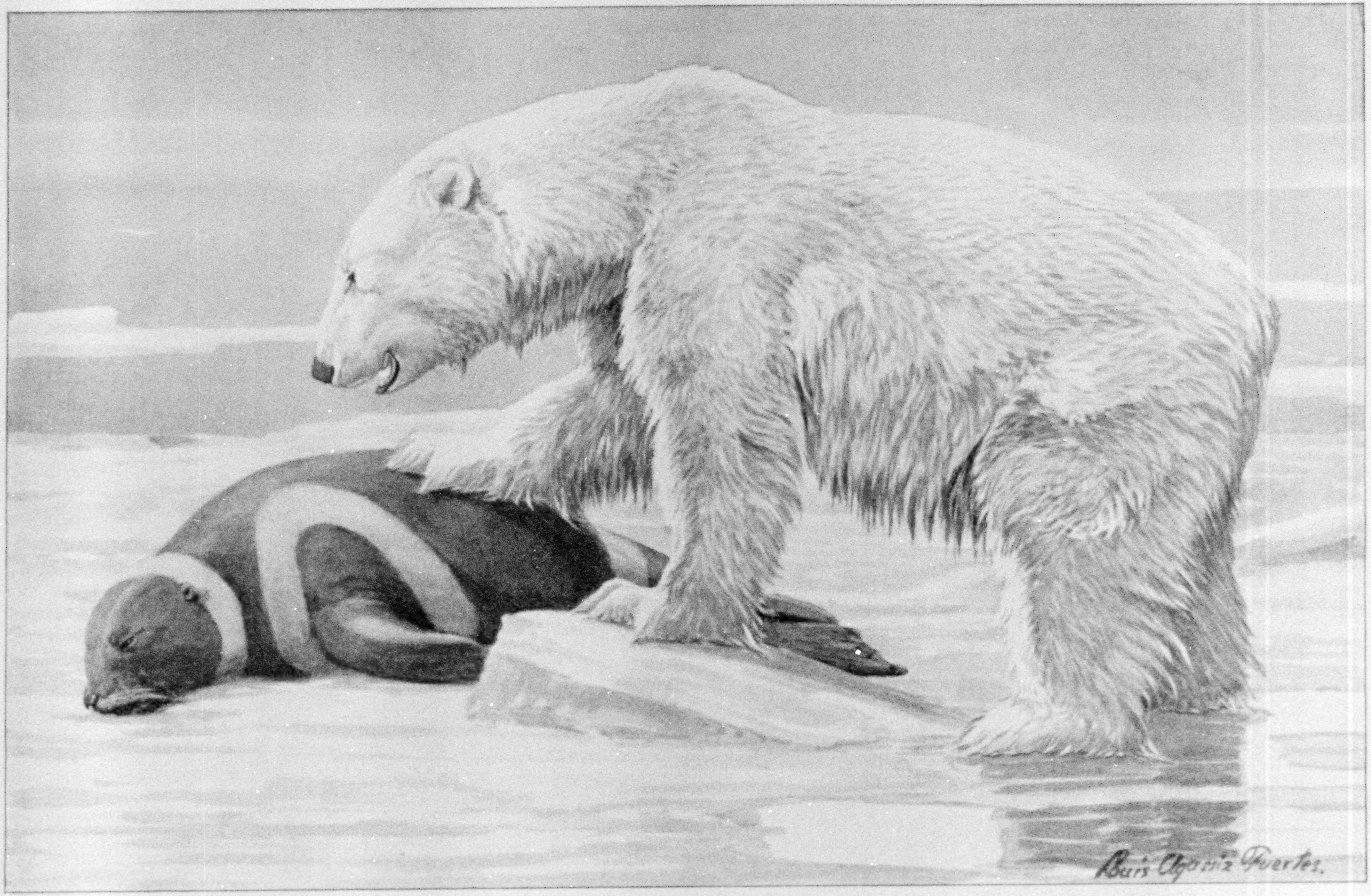
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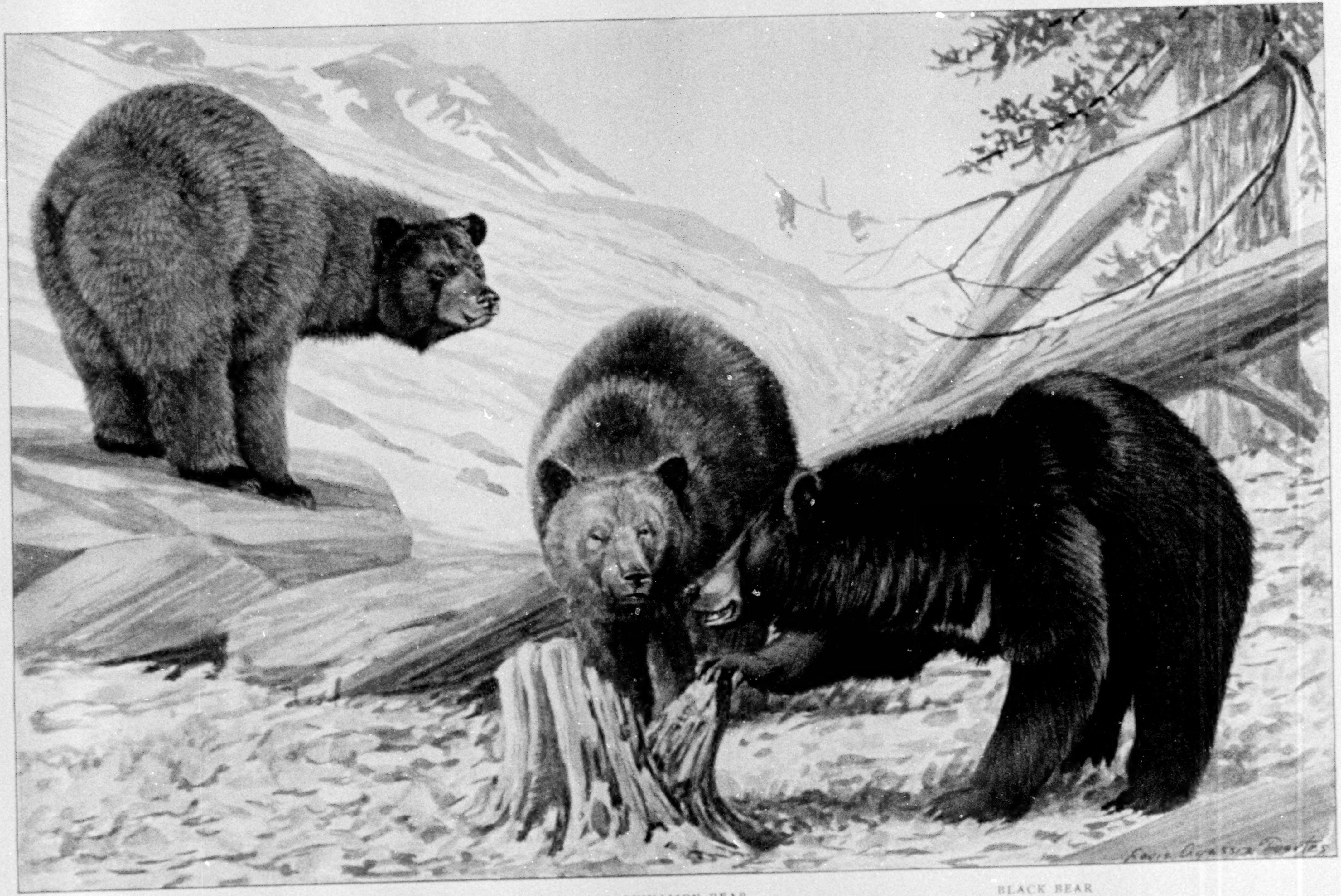
RIBBON SEAL

POLAR BEAR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GLACIER BEAR　CINNAMON BEAR　BLACK BEAR

The cinnamon bear is merely a color phase of the black bear

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almost bluish, gray to a dark iron gray, becoming almost black. Some individuals are extraordinary appearing beasts, quite unlike any other bear. The interest in this curious color development is increased by its restricted distribution.

The glacier bear is an Alaskan animal, which occupies the seaward front of the Mount St. Elias Range, about Yakutat Bay, and thence southeast to Glacier Bay and a short distance beyond toward the interior. The popular name of this bear was well chosen, as its home is in the midst of innumerable stupendous glaciers. Here, where the contours of gigantic mountain ranges are being steadily remade by glaciers, Nature appears to have begun the evolution of a new kind of bear. That the task is in progress is evidenced by the excessive variation in color, scarcely two individuals being the same.

The food of this bear consists largely of mice, ground squirrels, and marmots, which it digs from their burrows on the high mountain slopes. Its food is varied by salmon during the spawning season and by various herbs and berries during the summer. The winters in the home of the glacier bear are less severe than across the range in the interior, but are so long and stormy that the bear must spend more than six months each year in hibernation.

Owing to the remote and little-frequented region occupied by this bear, little is known of its life history. For this reason it is important that all sportsmen visiting its country bring back careful and detailed records of their observations. Up to the present time so few white men have killed glacier bears that a skin of one taken by fair stalking is a highly prized trophy. As the glacier bear country becomes more accessible, more stringent protection will be needed to prevent the extermination of these unique animals.

GRIZZLY BEAR (Ursus horribilis and its relatives)

Recent research has shown that the popular terms grizzly or silver-tip cover a group containing numerous species of large bears peculiar to North America, some of which, especially in California, have become extinct within the last 25 years. These bears vary much in size, some about equaling the black bear and others attaining a weight of more than 1,000 pounds. They vary in color from pale dull buffy to nearly black, usually with lighter tips to the hairs, which produce the characteristic grizzled or silver-tipped appearance upon which the common names are based.

The strongest and most distinctive external character of the grizzlies is the long, proportionately slender, and slightly curved claws on the front feet, sometimes more than 3 inches long.

Grizzly bears have a wide range—from the Arctic coast of Alaska southward, in a belt extending from the Rocky Mountains to the Pacific, through western Canada and the United States, and thence along the Sierra Madre of Mexico to southern Durango. They also occupy the barren grounds of northern Canada, and vague reports of a large brown bear in the interior of the Peninsula of Labrador indicate the possibility of the existence there of an unknown species of grizzly.

From the days of the earliest explorers of the Rocky Mountain region grizzly bears have borne the undisputed title of America's fiercest and most dangerous big game. In early days, having little fear of the primitive weapons of the Indians, they were bold and indifferent to the presence of man, and no higher badge of supreme courage and prowess could be gained by a warrior than a necklace of grizzly claws.

Since the advent of white men with guns, conditions have changed so adversely to the grizzlies that they have become extremely shy, and the slightest unusual noise or other alarm causes them to dash away at a lumbering, but surprisingly rapid, gallop. The deadly modern gun has produced this instinctive reaction for self-preservation. It does not mean, however, that grizzlies have lost their claim to the respect of even the best of hunters. They are still considered dangerous, and even in recent years experienced hunters have been killed or severely mauled by them. They are much more intelligent than the black bear, and thus, when wounded, are a more dangerous foe.

Like the black bear, the grizzlies are commonly nocturnal, but in remote districts often wander about in search of food by day. They roll over stones and tear open rotten wood in search of grubs and insects. They also dig out ground squirrels and other rodents and eat a variety of acorns and other wild nuts and fruits. As an offset to this lowly diet, many powerful old grizzlies, from the Rocky Mountains to California, have become notorious cattle-killers. They stalk cattle at night, and, seizing their prey by the head, usually break its neck, but sometimes hold and kill it by biting. These cattle-killing grizzlies still occur on the Western ranges. One or more wily marauders of this kind have run for years with a bounty of $1,000 on their heads.

Like other bears, grizzlies hibernate in winter, seeking small caves, or other shelter, and sometimes digging a den in the ground. The young, from one to four in number, are born in midwinter and are very small, naked, and but partly developed at birth. They go about with the mother throughout the summer and commonly den up with her the following winter. Although full-grown grizzlies are ordinarily solitary in habits, parties of from four to eight are sometimes seen. The object of these curious but probably brief companionships is not known.

Grizzlies are disappearing so rapidly that it is very desirable that they be placed on the list of game protected during part of the year, except in the case of the few individuals which become stock-killers. They are among the finest of native animals and their absence from the rugged slopes of the western mountains would leave a serious gap in our wild life.

ALASKAN BROWN BEAR (Ursus gyas and its relatives)

(See frontispiece of this Magazine for the illustration of this remarkable animal)

The Alaskan brown bears form a group of gigantic animals peculiar to North America and limited to the coast and islands of Alaska, from the head of Norton Sound to the Sitka Islands. The group includes a number of species, individuals of two of which, *Ursus gyas*, of the Alaska Peninsula, and *Ursus middendorffi*, of Kodiak Island, sometimes attain a weight of 1,500 pounds or more, and are not only the largest existing bears, but are the largest living carnivores in the world. They can be likened only to the great cave bears, which were the haunting terror of primitive mankind during the "Old Stone Age" in Europe. Brown bears still exist in Europe and Asia, but they form a distinct group of much smaller animals than the American species.

The Alaskan brown bears vary much in color, from a dull golden yellowish to a dusky brown, becoming almost black in some species. In color some of the darker species are indistinguishable from the great grizzlies, with which in places they share their range; but the relatively shorter, thicker, and more strongly curved claws on the front feet of the brown bears are distinctive.

As a rule they are inoffensive giants and take flight at the first sign of man. The taint left by a man's recent track or the faintest odor on the passing breeze, indicating the proximity of their dreaded enemy, is enough to start the largest of them in instant flight. Instances are reported of their having attacked people wantonly, but such cases are extremely rare. When wounded or suddenly surprised at close quarters, the instinct of self-defense not infrequently incites them to attack their enemy with furious energy. Many Indian and white hunters have been killed or terribly mauled by them in such encounters. At close quarters their great size, strength, and activity—astonishing for such apparently clumsy beasts—render them terrific antagonists.

Some of the species occupy open, rolling, or hilly tundras, and others live on the steepest and most rugged mountain slopes amid glaciers, rock slides, and perpetual snow-banks. On the approach of winter all retreat to dry locations, usually in the hills, where they dig dens in the earth or seek other cover to which they retire to hibernate, and here the young, usually two or three in number, are born. They usually emerge from hibernation in April or early May and wander about over the snow-covered hills and mountains. At this time their dark forms and their great tracks in the snow are so conspicuous that hunters have little difficulty in finding them.

Despite their size, brown bears devote much of their time to hunting such game as mice, ground squirrels, and marmots, which they dig from their burrows with extraordinary rapidity. During the salmon season, when the streams swarm with fish, bears frequent the lowlands and make trails along the water-courses, where they feed fat on this easy prey. During the summer and fall these great carnivores have the strange habit of grazing like cattle on the heavy grasslike growth of sedge in the lowland flats and benches, and also of eating many other plants.

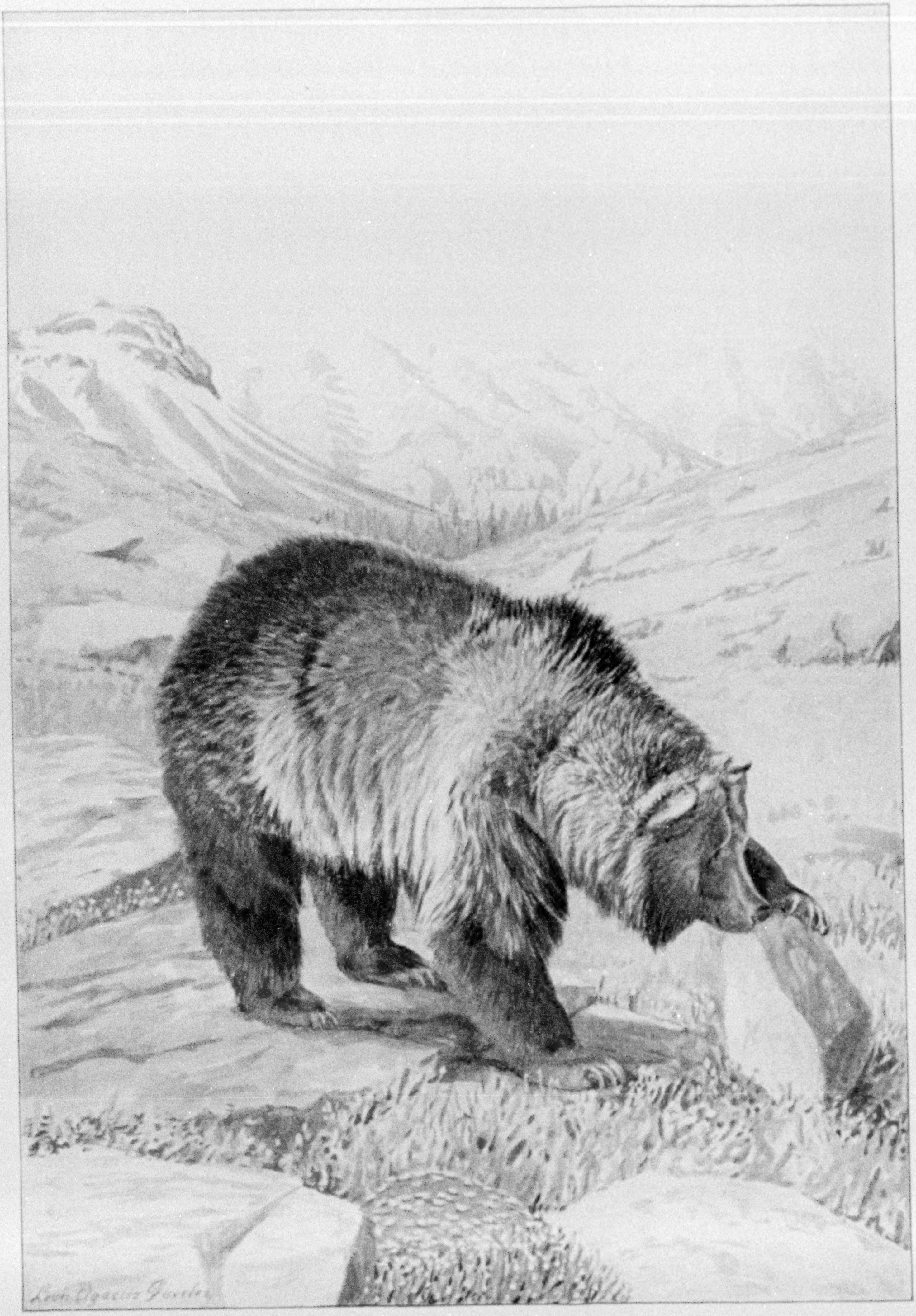
Although Alaska was long occupied by the Russians and has been a part of our territory since 1867, not until 1898 was there any definite public knowledge concerning the existence of these bears, notwithstanding their size and abundance. Since that time they have become well known to sportsmen and others as one of the wonders of the remarkable region they occupy. Their comparatively limited and easily accessible territory renders their future precarious unless proper measures for their reasonable protection are continued. They are certain to be exterminated near settlements; but there are ample wild and inhospitable areas where they may range in all their original freedom for centuries to come, provided man permits.

AMERICAN BEAVER (Castor canadensis and its subspecies)

When North America was first colonized, beavers existed in great numbers from coast to coast, in almost every locality where trees and bushes bordered streams and lakes, from near the Yukon Delta, in Alaska, and the Mackenzie Delta, on the Arctic coast, south to the mouths of the Colorado and the Rio Grande. Although now exterminated from most of their former range in the eastern United States, they still occur in diminished numbers over nearly all the remainder of their original territory, even in the lower Rio Grande and the delta of the Colorado. Their vertical distribution extends from sea-level to above an altitude of 9,000 feet.

Beavers are heavily built, round-bodied animals, with powerful chisel-shaped front teeth, short legs, fully webbed hind feet, and a flat, scaly tail. They are covered with long, coarse hairs overlying the short, dense, and silky underfur to which beaver skins owe their value. Their range covers the northern forested parts of both Old and New Worlds. The American species closely resembles in general appearance its Old World relative, but is distinctly larger, averaging 30 to 40 pounds in weight, but sometimes attaining a weight of more than 60 pounds. Owing to the different physical conditions in its wide range, the American animal has developed a number of geographic races.

Beavers mate permanently and have from two to five young each year. Their abundance and the high value of their fur exercised an unparalleled influence on the early exploration and development of North America. Beaver skins were the one ready product of the New World which the merchants of Europe were eager to purchase. As a consequence competition in the trade for these skins was the source of strong and bitter antagonisms be-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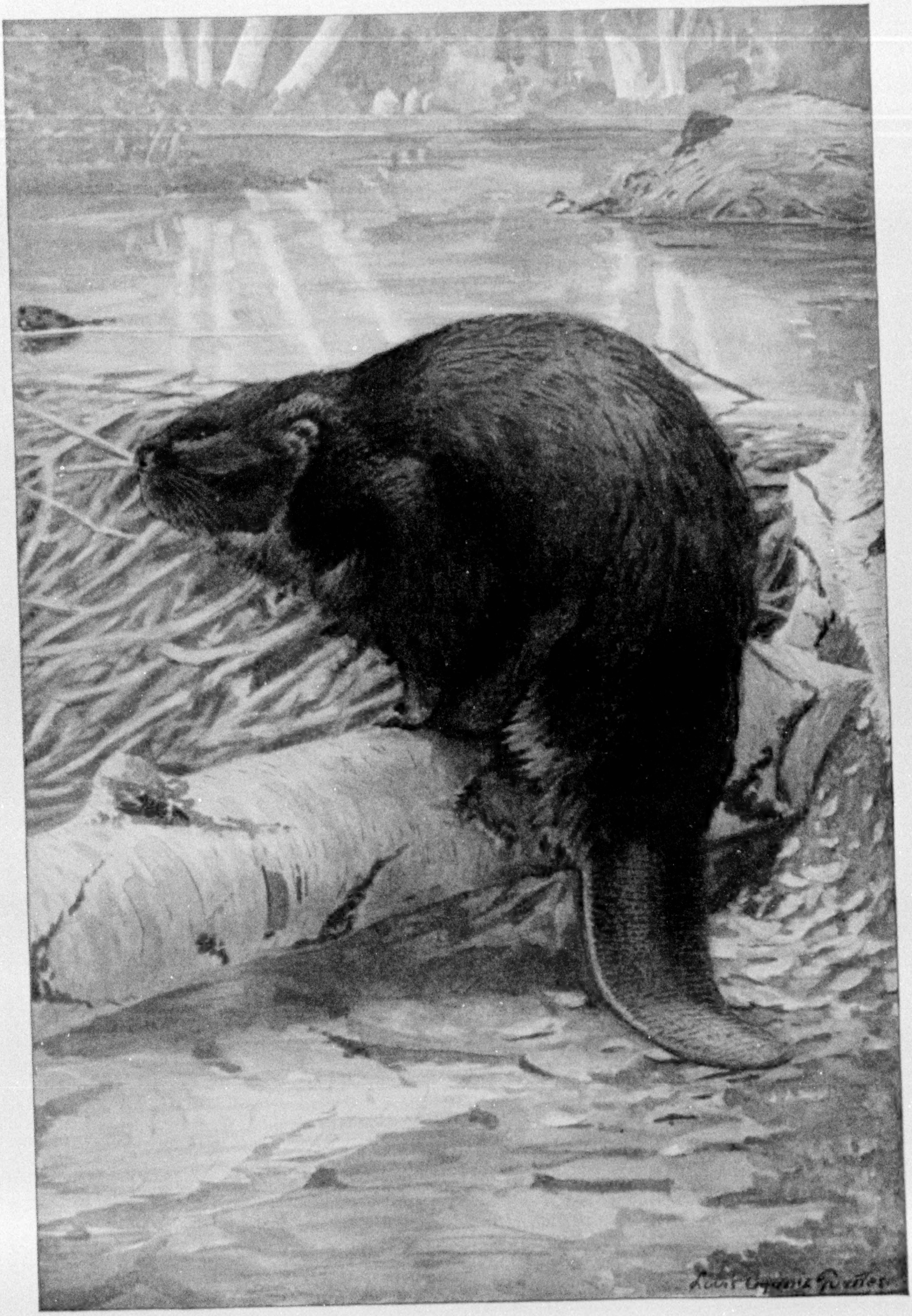
GRIZZLY BEAR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AMERICAN BEAVER

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tween individuals and companies, and even caused jealous rivalries among the Dutch, English, and French colonies.

Disputes over the right to trade in certain districts often led to bloodshed, and even to long wars, over great areas, where powerful rival companies fought for the control of a new empire. This eager competition among daring adventurers resulted in the constant extension of trading posts through the North and West, until the vanguard of civilization reached the far borders of the continent on the shores of the Arctic and Pacific Oceans.

Among the fur traders the beaver skin became the unit of value by which barter was conducted for all sorts of commodities. This usage extended even throughout northern Alaska, where it was current among the American fur traders until the discovery of gold there upset old standards.

Beavers belong to the rodent family—a group of animals notable for their weak mental powers. The beaver is the striking exception to the rule, and its extraordinary intelligence, industry, and skill have long excited admiration. It is scarcely entitled to the almost superhuman intelligence many endow it with, yet it certainly possesses surprising ability along certain lines. Furthermore, it can alter its habits promptly when a change in environment renders this advantageous.

In wild places, where rarely disturbed, beavers are unsuspicious, but where they are much trapped they become amazingly alert and can be taken only by the most skillful trapping. They are very proficient in building narrow dams of sticks, mud, and small stones across small streams for the purpose of backing up water and making "beaver ponds." In the border of these ponds a conical lodge is usually constructed of sticks and mud. It is several feet high and about 8 or 10 feet across at the base.

The entrance is usually under water, and a passageway leads to an interior chamber large enough to accommodate the pair and their well-grown young. From the ponds the animals sometimes dig narrow canals several hundred feet long back through the flats among the trees. Having short legs and heavy bodies, and consequently being awkward on land, beavers save themselves much labor by constructing canals for transporting the sticks and branches needed for food and for repairing their houses and dams.

Along the Colorado, lower Rio Grande, and other streams with high banks and variable water level, beavers usually dig tunnels leading from an entrance well under water to a snug chamber in the bank above water level. Under the varying conditions in different areas they make homes showing every degree of intergradation between the two types described.

Beavers live almost entirely on twigs and bark, and their gnawing powers are surprising. Where small trees less than a foot in diameter abound they are usually chosen, but the animals do not hesitate to attack large trees. On the headwaters of the San Francisco River, in western New Mexico, I saw a cottonwood nearly 30 inches in diameter that had been felled so skillfully that it had fallen with the top in the middle of a small beaver pond, thus assuring an abundance of food for the animals at their very door.

In the cold northern parts of their range, where streams and ponds remain frozen for months at a time, beavers gather freshly cut green twigs, sticks, and poles, which they weight down with mud and stones on the bottoms of ponds or streams near their houses, to be used for food during the shut-in period.

The mud used by beavers in building dams and houses is scooped up and carried against the breast, the front feet being used like hands. The flat tail serves as a rudder when the animal is swimming or diving, and to strike the surface of the water a resounding slap as a danger signal.

Beavers are usually nocturnal, but in districts where not disturbed they sometimes come out to work by day, especially late in the afternoon. Among the myriads of small streams and lakes in the great forested area north of Quebec they are very plentiful; their dams and houses are everywhere, sometimes four or five houses about one small lake. Their well-worn trails lead through the woods near the lake shores and frequently cross portages between lakes several hundred yards apart.

Where beavers continue to occupy streams in settled districts, they often make regular trails from a slide on the river bank back to neighboring cornfields, where they feast on the succulent stalks and green ears. They also injure orchards planted near their haunts, by girdling or felling the trees. Within recent years laws for their protection have been passed in many States, and beavers have been reintroduced in a number of localities. They should not be colonized in streams flowing through lands used for orchards or cornfields, nor where the available trees are too few to afford a continuous food supply.

FISHER, OR PEKAN (Mustela pennanti)

The fisher is one of the largest and handsomest members of the weasel family. Like others of this group, it is a long-bodied, short-legged animal. It attains an extreme length of from 3 to 3½ feet and a weight of 18 or 20 pounds, but the average is decidedly lower than these figures. In general, it is like a gigantic marten, and from its size and dark color is sometimes known locally as the "black cat" or "black fox."

It lives in the forested parts of Canada and the United States, where it originally occurred from the southern shores of Hudson Bay and Great Slave Lake south throughout most of eastern Canada and New England and along the Alleghanies to Tennessee; also in the Great Lakes region, south to the southern end of Lake Michigan; along the Rocky Mountains to Wyoming, down the Cascades to northern California, and from the Atlantic coast of Nova Scotia and Maine to the Pacific coast of southeastern Alaska and British Columbia. They still occur regularly in the Adirondacks of New York and the Green Mountains of Vermont and in Maine, but are gone from most of the southern border of their former range.

Fishers are powerful and agile animals, probably for their size by far the swiftest and most deadly of all our forest carnivores. So swift and dextrous are they in the tree-tops that they not only capture squirrels without difficulty, but are able to overtake and kill the marten, almost an incredible feat. When in pursuit of their prey or when alarmed, they make astonishing leaps from tree to tree. While not so speedy on the ground as some other animals, they have the tireless persistence of their kind and capture snowshoe hares in fair chase.

Among the habitants of the forest the fisher is a fearless and savage marauder, which feeds on frogs, fish, and nearly every bird and mammal its domain affords, except species so large that their size protects them. Porcupines are among its favorite victims and are killed by being turned over and attacked on their underparts. As a consequence of such captures, the fisher often has many quills imbedded in its head and the foreparts of its body.

The fisher, like many other predatory animals, has more or less regular "beats" along which they make their rounds over the territory each occupies. These rounds commonly require several days to accomplish. In winter they keep mainly along wooded ridges, where they are trapped.

It follows trap lines like the wolverine and eats the bait or the captured animal, but, unlike the wolverine, appears to have no propensity for further mischief. When overtaken by dogs or when at war with any of its forest rivals, it is so active and ferocious that it is worthy all due respect from antagonists several times its size.

Although essentially a tree animal, much of the fisher's time is spent on the ground. In summer it appears to be fond of heavy forests in low-lying situations and the vicinity of water. Its dens are usually located in a hollow high up in a large tree, but sometimes in the shelter of fallen tree trunks or crevices in the rocks, where, the last of April or early in May, the young are born. These may number from one to five, but are usually two or three. The young begin to follow the mother in her wanderings when quite small and do not leave her guardianship until nearly grown.

The fisher is not a common animal and only about 8,000 of its skins are marketed each year. Owing to its size, it is conspicuous, and its very fearlessness tends to jeopardize its existence. It is gone from most of the southern part of its former range and will no doubt continue steadily to lose ground with the increasing occupation of its haunts.

OTTER (**Lutra canadensis** and its relatives)

Land otters are common throughout a large part of the Old World, and when America was explored the animals were found generally distributed, and sometimes common, from the northern limit of trees in North America to southern South America. Within this great area a considerable number of species and geographic races of otters occur, all having a close general resemblance in appearance and habits.

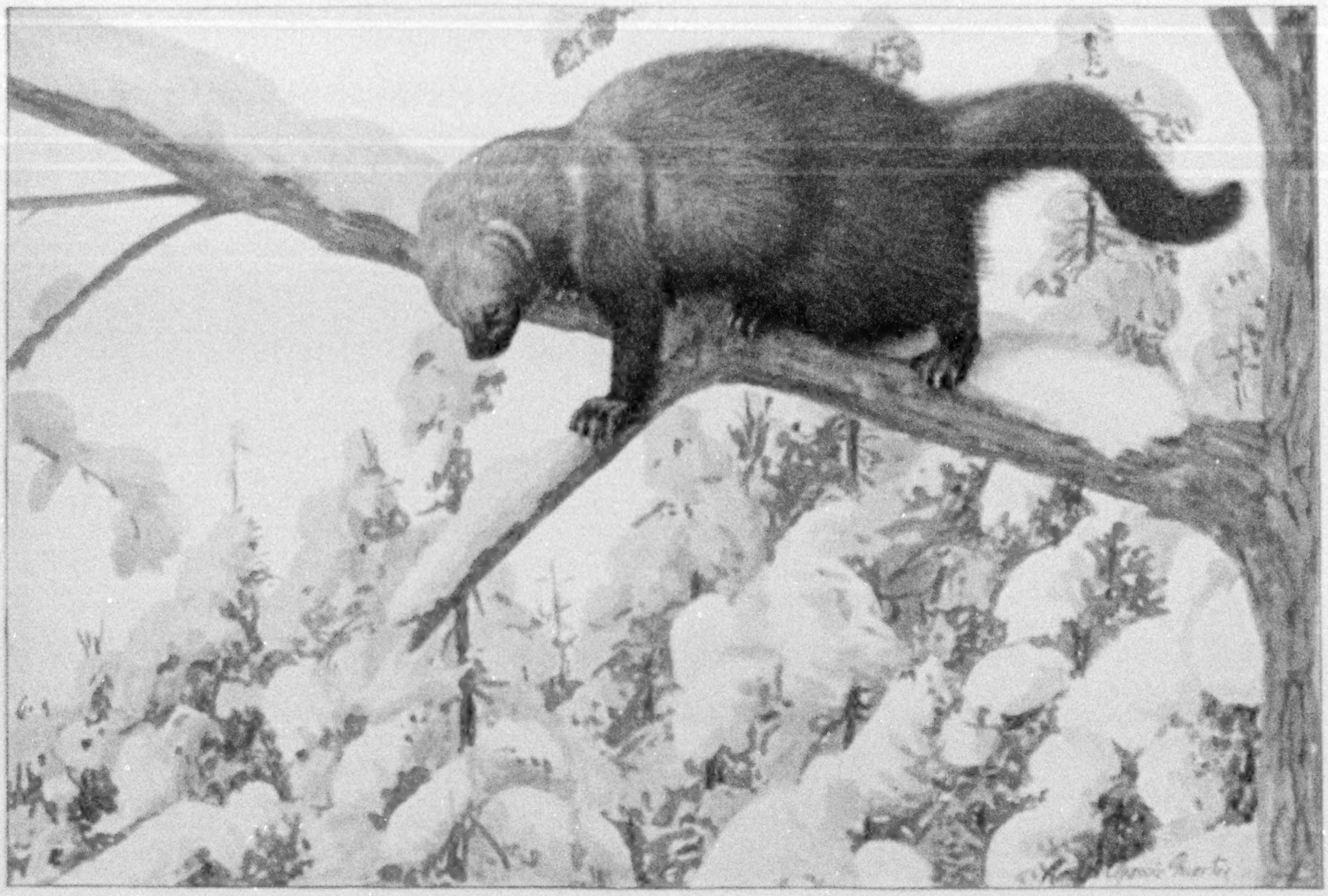
The Canadian otter is the well-known type throughout the United States, Canada, and Alaska. It is a slender, dusky brown animal, from 4 to 5 feet in length, frequenting streams and lakes which contain a good supply of fish. Otters are too short-legged to move easily on land, but are remarkable for their admirable grace, agility, and swiftness in the water. Although so poorly adapted to land travel, they are restless animals, constantly moving up and down the streams in which they live and often crossing from one stream to another. In the far north in midwinter they travel surprising distances across snow-clad country, following the banks of streams or passing between them searching for an entrance to water, whether through the ice or in open rapids.

In Alaska I saw many otter trails in the snow crossing the Yukon and through the adjacent forest. In such journeys it was evident that the animals progressed by a series of long bounds, each leaving a well-marked, full-length impression in the snow, so characteristic that it could not be mistaken. These trails, often leading for miles across country, always excited my deepest interest and wonder as to how these animals could succeed in finding holes through the ice in this vast snow-bound waste. Nevertheless they seemed to know full well, for the trails always appeared to be leading straight away for some known objective.

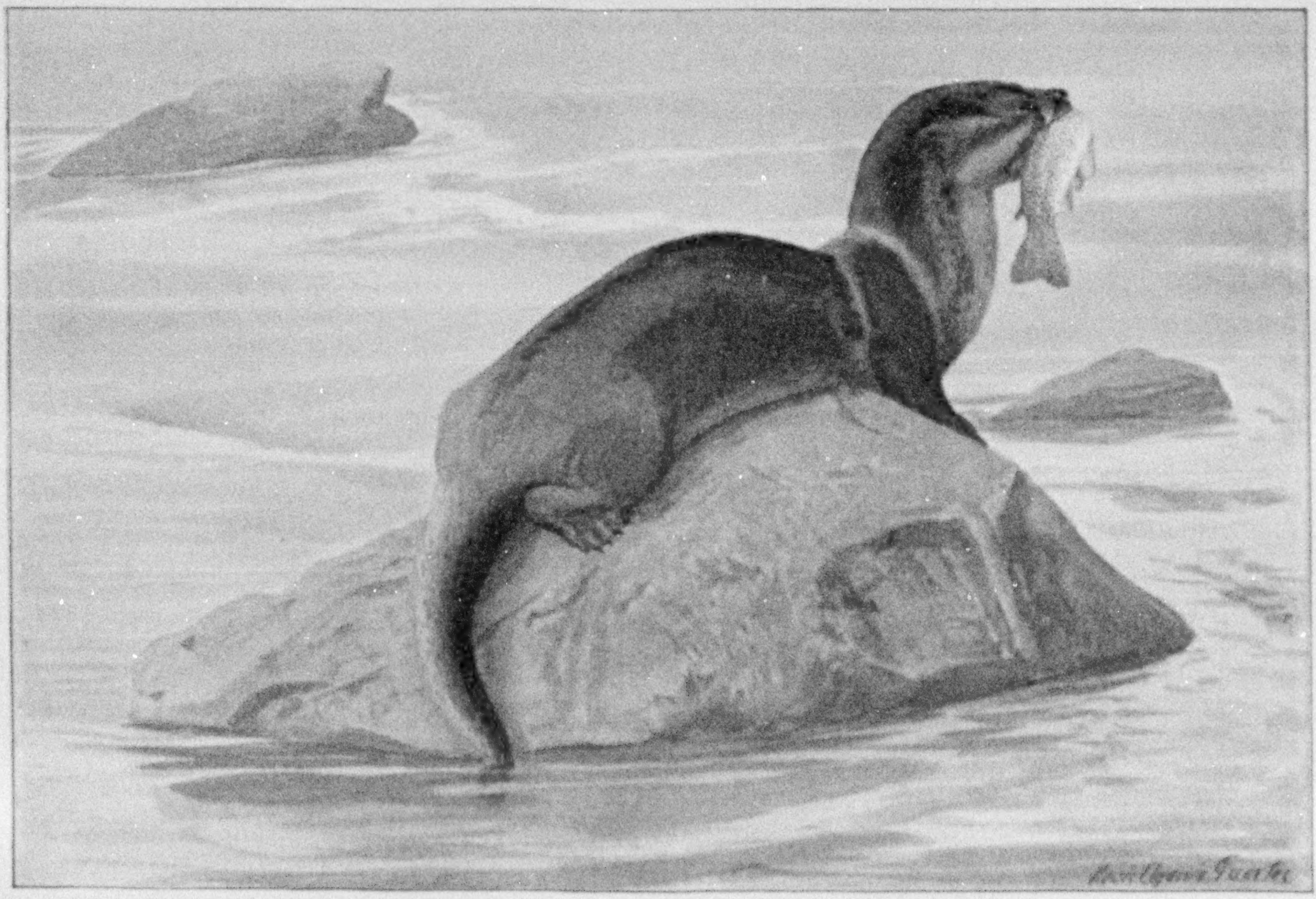
Although never very abundant, otters are so shy and solitary in their habits that they have managed to retain almost all of their original range. They occur now and then in the Potomac, near Washington, and in other rivers throughout the country, where their tracks may occasionally be detected on sand-bars and in the muddy shallows along the banks. A sight of the animals themselves is rare. Their dens are usually in the banks of streams or lakes above or below the surface of the water, under the roots of large trees, or beneath rocky ledges.

Otters are extremely playful and amuse themselves by sliding down steep banks into the water, repeatedly using the same place until a smooth chute or "slide" is defined. They usually have two to five young, which remain with the mother until nearly grown.

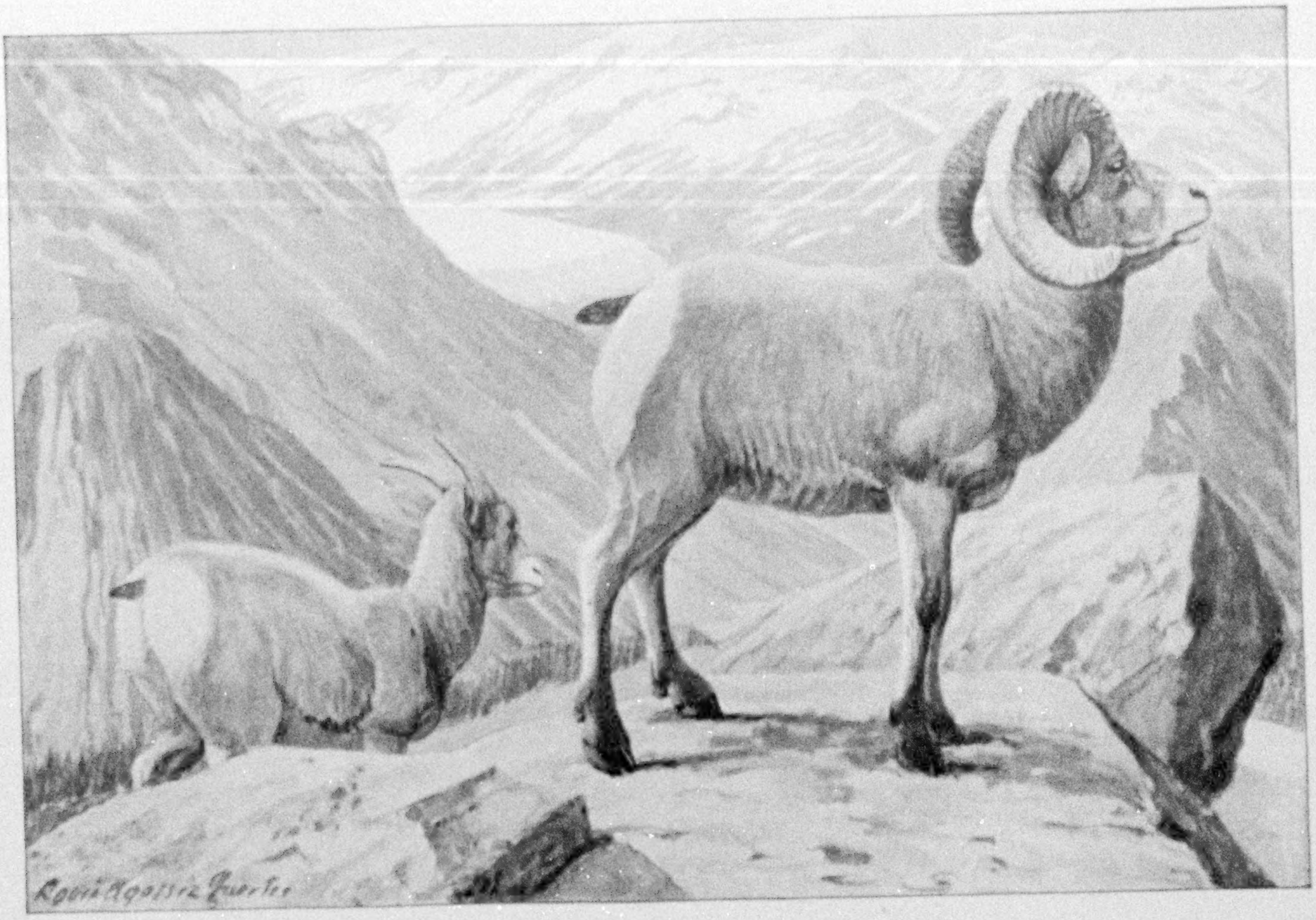
While close relatives of the weasel, they are much more intelligent, have a gentler disposition, and make playful and most interesting pets. Their fur is highly prized and always brings a good price in the market. As a result, they have been persistently hunted and trapped since our pioneer days. That the species should continue to exist, though in much diminished numbers, throughout most of its original range is a striking evidence of its retiring habits and mental acuteness.



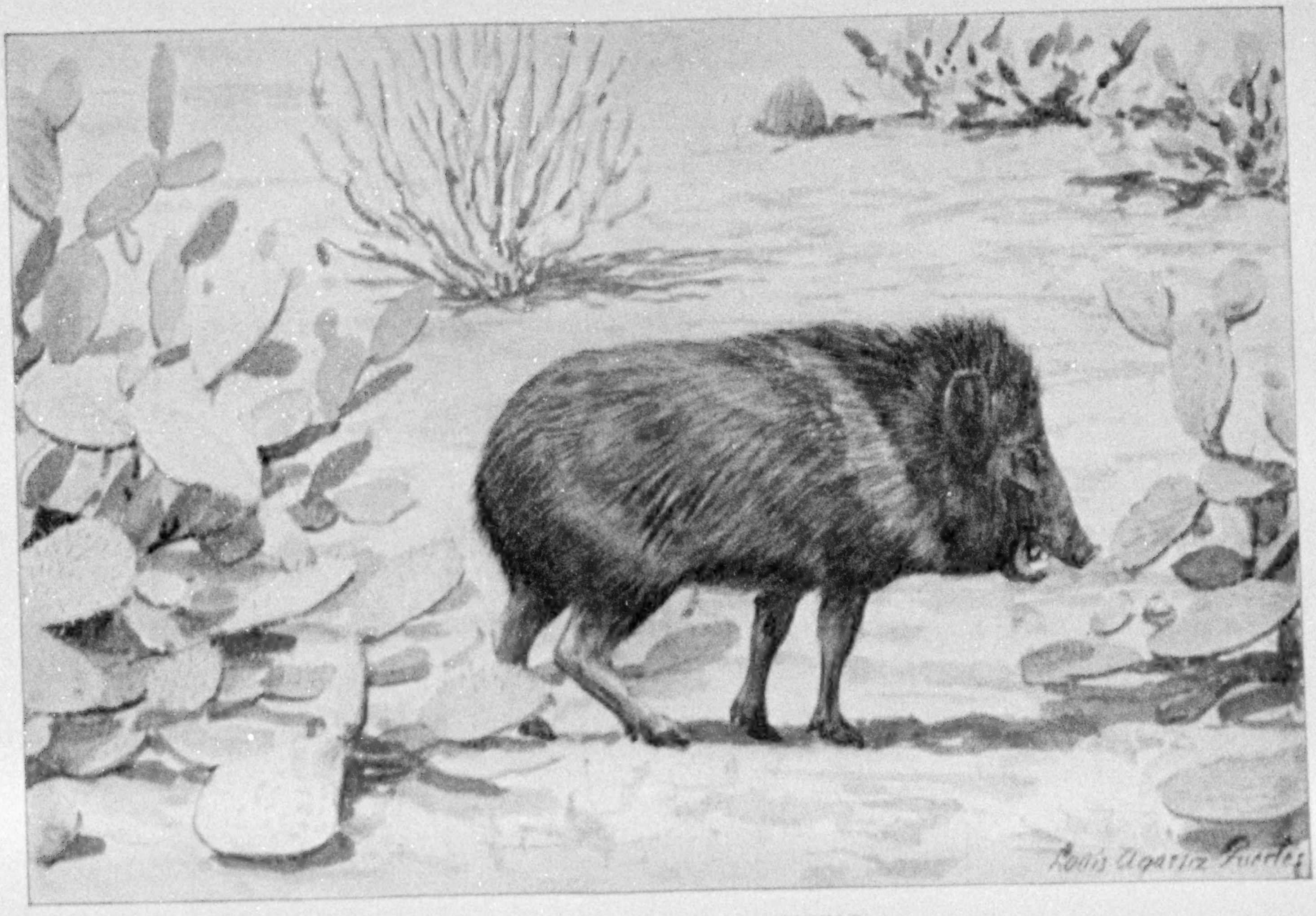
FISHER, OR PEKAN



OTTER


Louis Agassiz Fuertes

ROCKY MOUNTAIN SHEEP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COLLARED PECCARY, OR MUSKHOG

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COLLARED PECCARY, OR MUSKHOG
(Pecari angulatus)

The numerous and extraordinarily varied species of wild pigs of the Old World are represented in America by the peccaries, a specialized group containing two species of small pigs peculiar to North and South America. One of the many differences between them and their Old World relatives is their having but two young. The name muskhog, applied to them, is based on their possession of a large gland, located high up on the middle of the rump, which emits a powerful odor. The musky odor from this quickly permeates the flesh of a peccary, unless it is cut out as soon as the animal is killed.

The collared peccary is the smaller of the two species, usually weighing less than 75 pounds. It ranges from the southwestern United States south to Patagonia. Within this range numerous geographic races have developed, varying from light grizzled gray to nearly black. It formerly occurred within our border north to the Red River of Arkansas, but is now limited to the southern half of Texas and the southern parts of New Mexico and Arizona.

In tropical America collared peccaries are found in dense forests or in low jungles, but in northern Mexico and the southwestern United States they are equally at home among scattered thickets of cactus and other thorny plants on plains and in the foothills. They are strictly gregarious and live in bands of from a few individuals up to thirty or more, usually led by the oldest and most powerful boar. They are omnivorous, feeding on everything edible, from roots, fruits, nuts, and other vegetable products to reptiles and any other available animals. They are specially numerous in many tropical forests where wild figs, nut palms, and other fruit-bearing trees provide abundant food. In the arid northern part of their range dense thickets of cactus and mesquite afford both food and shelter. Their presence in a locality is often indicated by the rooted-up soil where they have been feeding.

Young peccaries become very tame and make most intelligent and amusing pets. One moonlight night on the coast of Guerrero two of us, after a bath in the sea by a small Indian village, strolled along the hard white sand to enjoy the cool breeze. Suddenly a little peccary, not weighing over eight or ten pounds, came running to meet us and, after stopping at our feet to have its head scratched, suddenly circled about us, away and back again in whirling zigzags, with all the joyous frenzy of a playful puppy. Continuing this performance, it accompanied us for several hundred yards, until we returned to the village.

Tales of the ferocity of bands of the collared peccaries and of their treeing hunters who have disturbed them read well to the novice, but have little foundation in fact. In reality the animals are shy and retiring and fight only when forced to do so for self-protection. When brought to bay by dogs or other animals, they fight viciously, and with their sharp, knife-edged tusks can inflict serious wounds. Their natural enemies are mainly the jaguar in the south and bobcats and coyotes, which prey upon their young, in the north.

The increasing occupation of our Southwest has already resulted in the extermination of peccaries from most of their former range within our border, and unless active steps are taken to protect the survivors their days will be few in the land. They are such unique and harmless animals that it is hoped interest in their behalf may be awakened in time to retain them as a part of our wild life.

ROCKY MOUNTAIN SHEEP (Ovis **canadensis** and its relatives)

Wild sheep inhabit mountain ranges in both Old and New Worlds. Northern Africa and southern Europe have representative species, but Asia appears to be the true home of the group. There the greatest variety of species is found, including such giants as *Ovis poli*.

In the New World they occur only in North America, where there are two or three species, with numerous geographic races. Among these the sheep inhabiting the main Rocky Mountain region is best known. It is a heavier animal than its northern relatives of the Stikine country and Alaska, with larger and more massively proportioned horns. It occupies the main range from south of Peace River and Lake Babine, in British Columbia, to Colorado, and possibly northern New Mexico. Closely related geographic races occur elsewhere in the mountains of the western United States and northern Mexico.

The usual conception of wild sheep as habitants of the cold, clear upper world at timberline and above is justified in the case of the Rocky Mountain sheep. In early spring its one or two young are born amid these rugged elevations, where it remains until the heavy winter snows drive it down, sometimes through the open timber to the foothills. That wild sheep thrive equally well under very different conditions, however, is shown by their abundance on the treeless mountains of our southwestern deserts, among cactuses, yuccas, and other thorny vegetation, where water is extremely scarce and summer temperatures rise high above 100° Fahrenheit in the shade.

The Rocky Mountain sheep, like other species, appears to feed on nearly every plant growing within its domain. In spring many lambs are killed by bald and golden eagles, and in winter, when driven down to lower levels by snow, it becomes easy prey for mountain lions, wolves, and coyotes. Owing to continuous hunting, this sheep has disappeared from many of its former haunts and is decreasing in most of its range. When effective protection is undertaken in time, however, as in Colorado, the range is readily restocked.

The sure-footedness with which a band of these sheep will dash in full flight up or down seemingly impossible slopes, where a misstep would mean death, is amazing. Even the old rams, with massive sets of horns, bound from point to point up a steep rock slope with marvelous grace and agility. Mountain sheep living among the rugged summits of high ranges possess the courage and prowess of skillful mountaineers, so admired by all, and the mere sight of one of these animals in its native haunts is an adventure achieved by few.

No other big-game animal carries with it the romantic glamour which surrounds this habitant of the cold, clear upper world. Big-game hunters prize above all others their mountain-sheep trophies, which form vivid reminders of glorious days amid the most inspiring surroundings and evidence their supreme prowess in the chase.

STONE MOUNTAIN SHEEP (Ovis stonei)

Owing to its dark, iron gray color, *Ovis stonei* is often called the "black" mountain sheep. Despite its dark color, the Stone sheep is probably a geographic race of the pure white Dall sheep of Alaska. It has the same slender, gracefully coiled horns, frequently amber colored and extended in a widely spread spiral.

Its range lies in northern British Columbia, especially about the upper Stikine River and its tributaries; thence it extends easterly to Laurier Pass in the Rocky Mountains, north of Peace River, and south perhaps to Babine Lake. Unfortunately it appears to have become extinct in the southern border of its range, so that its real relationship with the Rocky Mountain sheep farther south may never be determined.

The sheep occupying the mountains between the home of typical *stonei* and that of *dalli* in northwestern British Columbia and southeastern Yukon Territory are characterized by having white heads, with bodies of a varying shade of iron gray, thus showing evident intergradation on a great scale between the white northern sheep and the "black" sheep of the Stikine. These intermediate animals have been called the Fannin, or saddle-backed, sheep (*Ovis fannini*). Hunters report a considerable mingling of entirely white animals among flocks of these intergrading animals, and occasionally white individuals are seen even in flocks of the typical dark sheep of the Stikine country.

Like the white Alaskan sheep, the Stone sheep exists in great abundance in many parts of its range, especially east of Dease Lake. It usually ranges in flocks, those made up of ewes and young rams often containing a considerable number. The old bucks, except in fall, keep by themselves in smaller bands in separate parts of the range. The Stone sheep lives in one of the most notable big-game fields of the continent. Its home above timberline is shared with the mountain goat and in the lower open slopes with the caribou, while within the adjacent forests wander the moose and two or more species of bear.

Owing to its frequenting remote and sparsely inhabited country, it continues to exist in large numbers; but if its range becomes more accessible, only the most stringent protection can save this splendid animal from the extermination already accomplished on the southern border of its range.

DALL MOUNTAIN SHEEP (Ovis dalli)

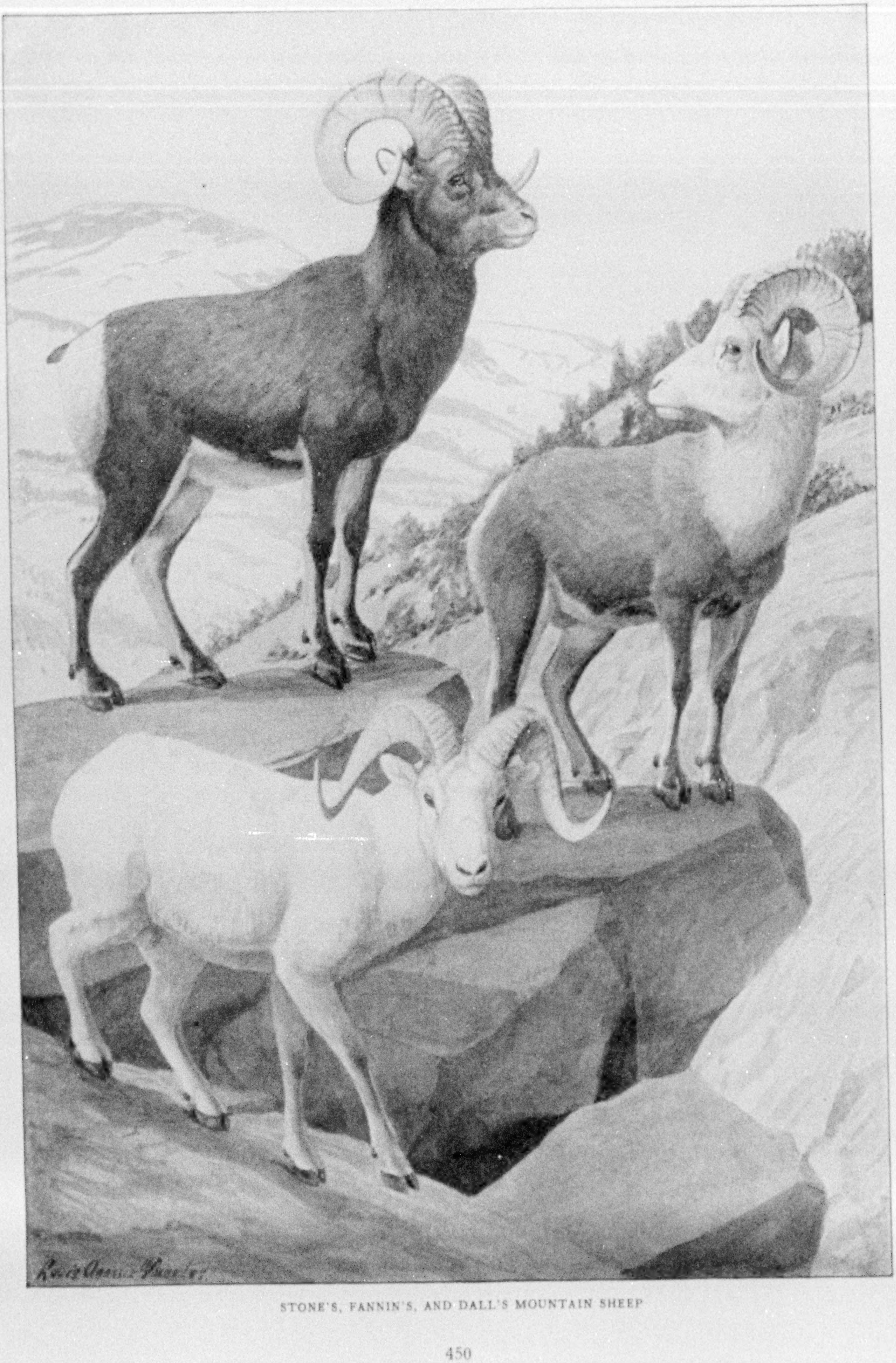
The only variation in the pure white coat of the Dall sheep is a mixture of a few black hairs on the rump, sometimes becoming plentiful enough to form a blackish spot on the tail and a light brownish stain over the entire body, due to the slight discoloration at the tips of the hairs from contact with the earth in their bedding-down places. Their horns are usually dull amber yellow and are notable for their slender proportions and the grace of their sweeping coils, which sometimes curve close to the head and again spread in a wide, open spiral.

As their white coats indicate, the Dall sheep are the northernmost of their kind in America. Their home lies mainly in Alaska, where they were formerly abundant in many mountain ranges, from those bordering the Arctic coast south through the interior to the cliffs on Kenai Peninsula, but are now scarce or gone from some mountains. To the eastward they are numerous across the border in much of Yukon territory, nearly to the Mackenzie River. Their haunts lie amid a wilderness of peaks and ridges, marked in summer with scattered glaciers and banks of perpetual snow and in winter exposed to all the rigors of a severe Arctic climate. They are extraordinarily numerous in some districts, as among the outlying ranges about the base of Mount McKinley.

In their high, bleak homes these sheep have little to fear from natural enemies, although the great Canada lynx, the wolf, the wolverine, and the golden eagle, as overlords of the range, take occasional toll from their numbers. Their one devastating enemy is man, with his modern high-power rifle. Even so long ago as the summer of 1881, I saw hundreds of their skins among the Eskimos at Point Barrow, taken that spring with the use of Winchester rifles among the mountains lying inland from the Arctic coast. Of late years the advent of miners and the establishment of mining camps and towns have greatly increased the demand for meat, and this has resulted in the killing of thousands of these sheep. Large numbers of these splendid animals have also been killed to serve as winter dog food.

The advent of thousands of men engaged in the construction of the government railroad which, when completed, will pass through the Mount McKinley region, makes imminent the danger of extermination that threatens the mountain sheep, as well as the moose and caribou, in a great area of the finest big-game country left under our control.

Properly conserved, the game animals of Alaska will continue indefinitely as one of its richest resources, but heedless wastefulness may destroy them forever. All sportsmen and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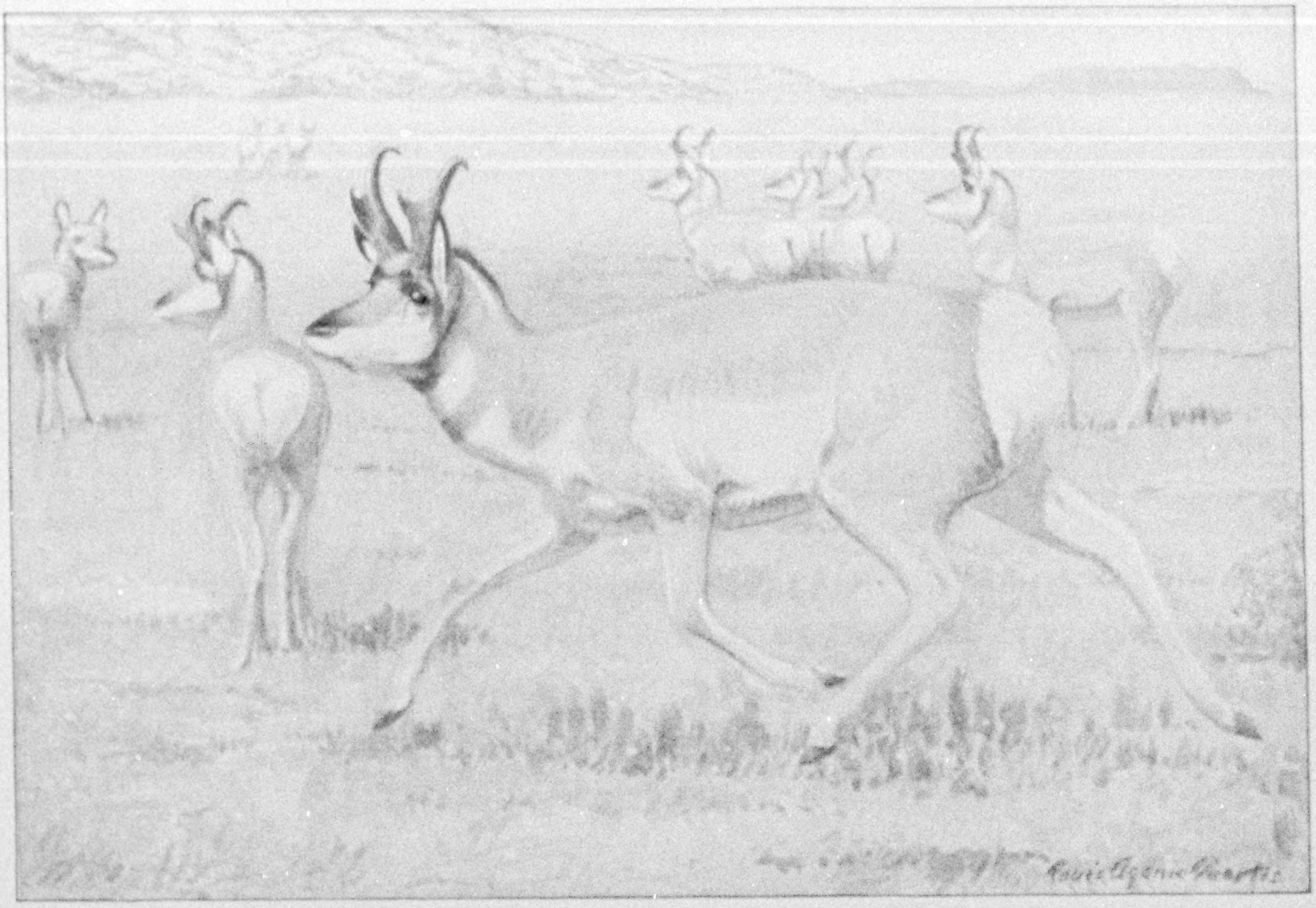
STONE'S, FANNIN'S, AND DALL'S MOUNTAIN SHEEP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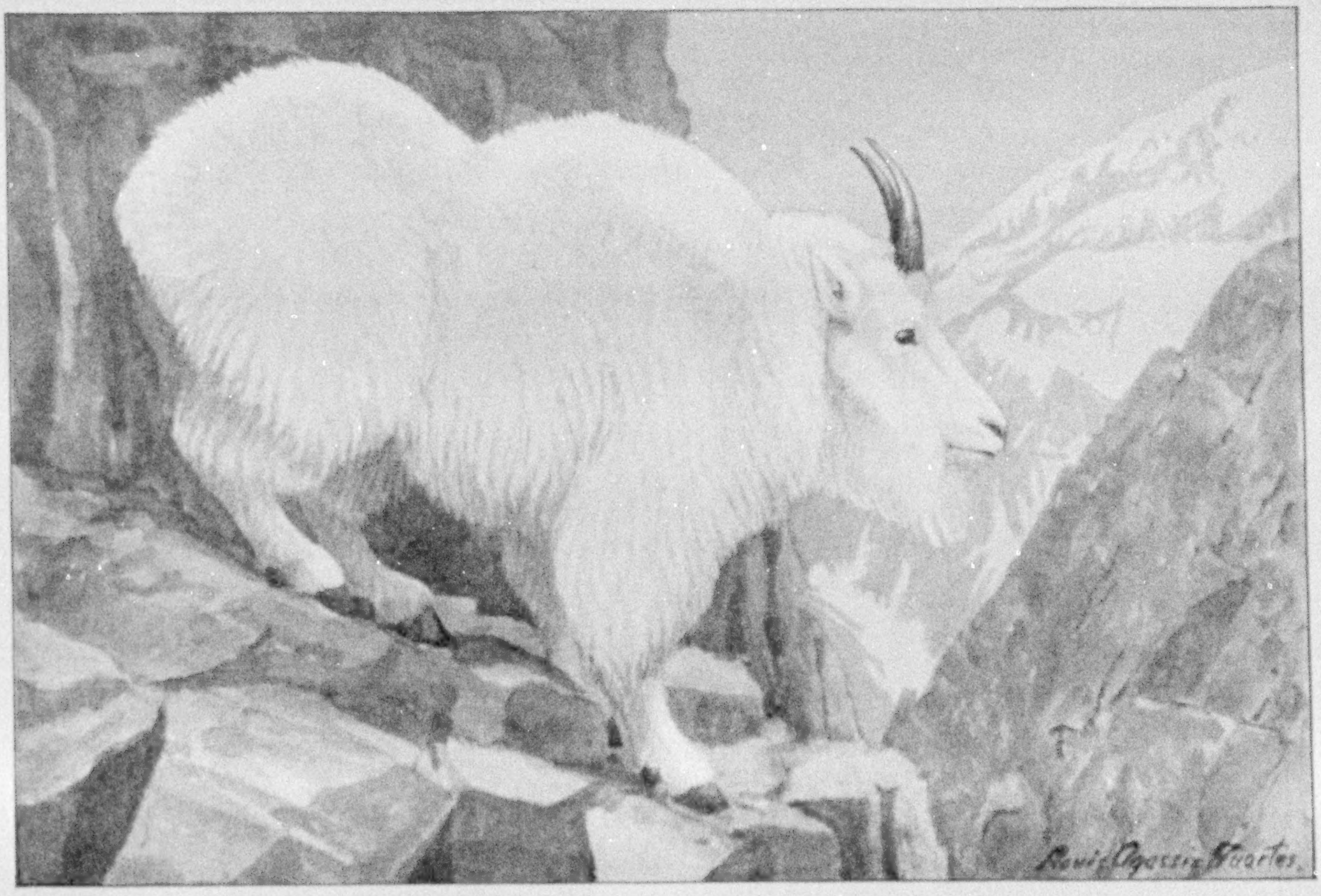
PRONG-HORN ANTELOPE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ROCKY MOUNTAIN GOAT

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other lovers of wild life should interest themselves in an effort to safeguard the future of Alaskan game animals before it is too late; for, under the severe climatic conditions prevailing, the restocking of exhausted game fields in that region will be extremely difficult, if not practically impossible.

ROCKY MOUNTAIN GOAT (**Oreamnos montanus** and its subspecies)

The numerous wild goats of the Himalayas and other mountains of Asia are represented in America solely by the Rocky Mountain goat. This is one of the most characteristic, but least graceful in form and action, of our big-game animals. It is distinguished by a long ungainly head, ornamented with small black horns; a heavy body, humped at the shoulders like a buffalo, and a coat of long shaggy white hair.

The range of these habitants of the cliffs extends from the head of Cook Inlet, Alaska, easterly and southerly through the mountains to Montana and Washington. Unlike mountain sheep, the goats do not appear to dislike the fogs and saline winds from the sea, and at various points along the coast of British Columbia and Alaska they range down precipitous slopes nearly to the shore.

They are much more closely confined to rugged slopes and rocky ledges than the mountain sheep, which in winter commonly descend through the foothills to the border of the plains. Through summer and winter, goats find sufficient food in the scanty vegetation growing among the rocks, and their heavy coats of hair protect them from the fiercest winter storms.

Owing to their small horns and unpalatable flesh they are less sought after by hunters than mountain sheep, and thus continue to exist in many accessible places where otherwise they would long since have become exterminated. They are frequently visible on the high ledges of a mountain across the bay from the city of Vancouver and are not difficult to find in many other coastal localities.

Although marvelously surefooted and fearless in traversing the faces of high precipitous slopes, goats lack the springy grace and vivacity of mountain sheep and move with comparative deliberation. They are reputed to show at times a stupid obstinacy when encountered on a narrow ledge, even to the point of disputing the right of way with the hunter.

Their presence lends interest to many otherwise grim and forbidding ranges where, amid a wilderness of glacier-carved escarpments, they endure the winter gales which for days at a time roar about their cliffs and send snow banners streaming from the jagged summits overhead.

Owing to the character of their haunts, mountain goats have few natural enemies. The golden and bald eagles now and then take toll among their kids, but the lynx and mountain lion, their four-footed foes, are not known to prey upon them to any considerable extent. Through overhunting they have vanished from some of their former haunts, but still hold their own in many places, and with effective protection will long continue to occupy their peculiar place in our fauna.

PRONG-HORN ANTELOPE (**Antilocapra americana** and its geographic races)

Unique among the antelope of the world, among which it has no near relatives, the prong-horn, because of its beauty of coloration, its grace, and fleetness, claims the attention of sportsmen and nature lovers alike. It is a smaller and slenderer animal than the larger forms of the Virginia deer. Its hair is coarse and brittle, and the spongy skin lacks the tough fiber needed to make good buckskin. Both sexes have horns, those of the doe being smaller and slenderer. One of the extraordinary peculiarities of this antelope is its habit of shedding the horns every fall and the developing new horns over the remaining bony core.

The rump patch of the prong-horn is formed of long pure white hairs, which in moments of excitement or alarm are raised on end to form two great chrysanthemum-like white rosettes that produce an astonishingly conspicuous directive color mark. The power to raise these hairs is exercised by the fawns when only a few days old. Even when the hairs are not erected the rump patch is conspicuous as a flashing white signal to a distance of from one to two miles as the antelope gallops away. When the animal whose rump signal has been plainly visible at a distance suddenly halts and faces about to look back, as is a common custom, its general color blends with that of the background and it vanishes from sight as by magic.

Early explorers discovered antelope in great abundance over a vast territory extending from near the present location of Edmonton, Alberta, south to near the Valley of Mexico, and from central Iowa west to the Pacific coast in California. They were specially numerous on the limitless plains of the "Great American Desert," where our pioneers found them in great bands, containing thousands, among the vast herds of buffalo. So abundant were they that it has been estimated that on the Great Plains they equaled the buffalo in numbers. Now reduced to a pitiful remnant of their former numbers, they exist only in widely scattered areas, where they are constantly decreasing. Fortunately they are strictly protected by law in most of their remaining territory.

The great herds containing thousands of antelope were usually formed late in fall and remained together throughout the winter, separating into numerous smaller parties during the summer. For years following the completion of the transcontinental railroads they were commonly seen from the car windows as trains crossed the Great Plains. At such times their bright colors and graceful evolutions, as they swept here and there in erratic flight or wheeled in curiosity to gaze at the passing train, never failed to excite the deepest interest.

In early days prong-horns were noted for their curiosity and were frequently lured within gun-shot by waving a red flag or by other devices. I have repeatedly seen them circle or race a team, or a horseman, crossing their range. In racing a horseman traveling along an open road or trail they gradually draw nearer until finally every member of the band dashes madly by only a few yards in front and then straight away across the plains in full flight.

The prong-horns appear to possess a highly nervous temperament, which requires for their welfare the wide free sweep of the open plains. They do not thrive and increase in inclosures, even in large game preserves, as do deer, elk, and buffalo. For this reason, it will require the greatest care to protect and foster these attractive members of our fauna to save them from soon being numbered among the many wild species which have been destroyed by the coming of civilized man.

WAPITI, OR AMERICAN ELK (Cervus canadensis and its relatives)

By a curious transposition of names the early settlers applied to the American wapiti the term elk, which belongs to the European representative of our moose. Our elk is a close relative of the European stag. It is the handsomest and, next to the moose, the largest member of the deer family in America. The old bulls, weighing more than 800 pounds, bear superb widely branched antlers, which give them a picturesque and noble mien. This is the only American deer which has a well-marked light rump-patch. The young, numbering from one to three, are white spotted, like the fawns of other deer.

Originally the elk was the most wide ranging of our hoofed game animals. It occupied all the continent from north of Peace River, Canada, south to southern New Mexico, and from central Massachusetts and North Carolina to the Pacific coast of California. Like the buffalo, it appeared to be equally at home in the forested region east of the Mississippi River and on the open plains flanking the Rocky Mountains. Its range also extended from sea-level to above timberline on lofty mountain ranges.

Exterminated throughout most of their original range, elk still occupy some of their early haunts in western Canada, Montana, Wyoming, Colorado, and the Pacific Coast States. The last elk was killed in Pennsylvania about 60 years ago, and in Michigan and Minnesota some 20 years later. The main body of the survivors are now in the Yellowstone Park region. Their size and the readiness with which they thrive in captivity has led to serious consideration of elk farming as an industry.

In the West, before the settlement of their range crowded the elk back, large numbers lived throughout the year on the plains and among the foothills. They have now become mountain animals, spending the spring and summer largely in the timberline forests and alpine meadows, where many bands linger until the heavy snows of early winter force them down to the foothills and valleys. During the last days of their abundance in the Rocky Mountains winter herds numbering thousands gathered in Estes Park and other foothill valleys.

Elk are the most polygamous of all our deer, each bull gathering a small herd of cows during the fall. At the beginning of the mating season the bulls wander widely through the high forest glades, their musical bugling piercing the silence with some of the most stirring notes of the wilderness. Amid the wild grandeur of these remote mountain fastnesses the appearance of a full-antlered buck on the sky-line of some bare ridge presents a noble picture of wild life.

There are probably over 40,000 elk still left in the United States, and of these more than 30,000 are located in Wyoming, mainly in and about Yellowstone National Park.

During the last few years great interest has been shown in the reintroduction of elk in parts of their former range, where they had been exterminated and where conditions are still suitable for their perpetuation. Such efforts are meeting with much success. Not only do the animals thrive and increase rapidly, but local sentiment is almost unanimous in their favor. This is well shown by the active interest taken by both cattle and sheep owners in northern Arizona in regard to a band of elk introduced a few years ago on their mountain stock ranges. The stockmen exercise a virtual wardenship over these animals that insures them against molestation, and the herd is rapidly increasing.

As against this, we have the despicable work of poachers, who are shooting elk for their two canine teeth and leaving the body to the coyotes. Information has been received that more than 500 elk were ruthlessly slaughtered for this purpose about the border of Yellowstone National Park during the winter of 1915-1916.

MULE DEER (Odocoileus hemionus and its subspecies)

Mule deer are larger than the common white-tails, with a heavier, stockier form. Their strongest characteristics lie in the large doubly branching antlers, large broad ears, and rounded whitish tail with a brushlike black tip. Their common name in this country and the name "venado burro" in Mexico are derived from the great, donkeylike ears. Their antlers vary much in size, but in some examples are almost intermediate between those of the white-tail and of the elk. Antlers of the mule deer and of the black-tail agree in having the tines all pronged, in contrast with the single spikes of the white-tails. In summer these deer have a rich, rusty red coat which is exchanged in winter for one of grayish brown.

The range of mule deer extends from northern Alberta, Manitoba, and western Iowa to the State of San Luis Potosi, on the Mexican

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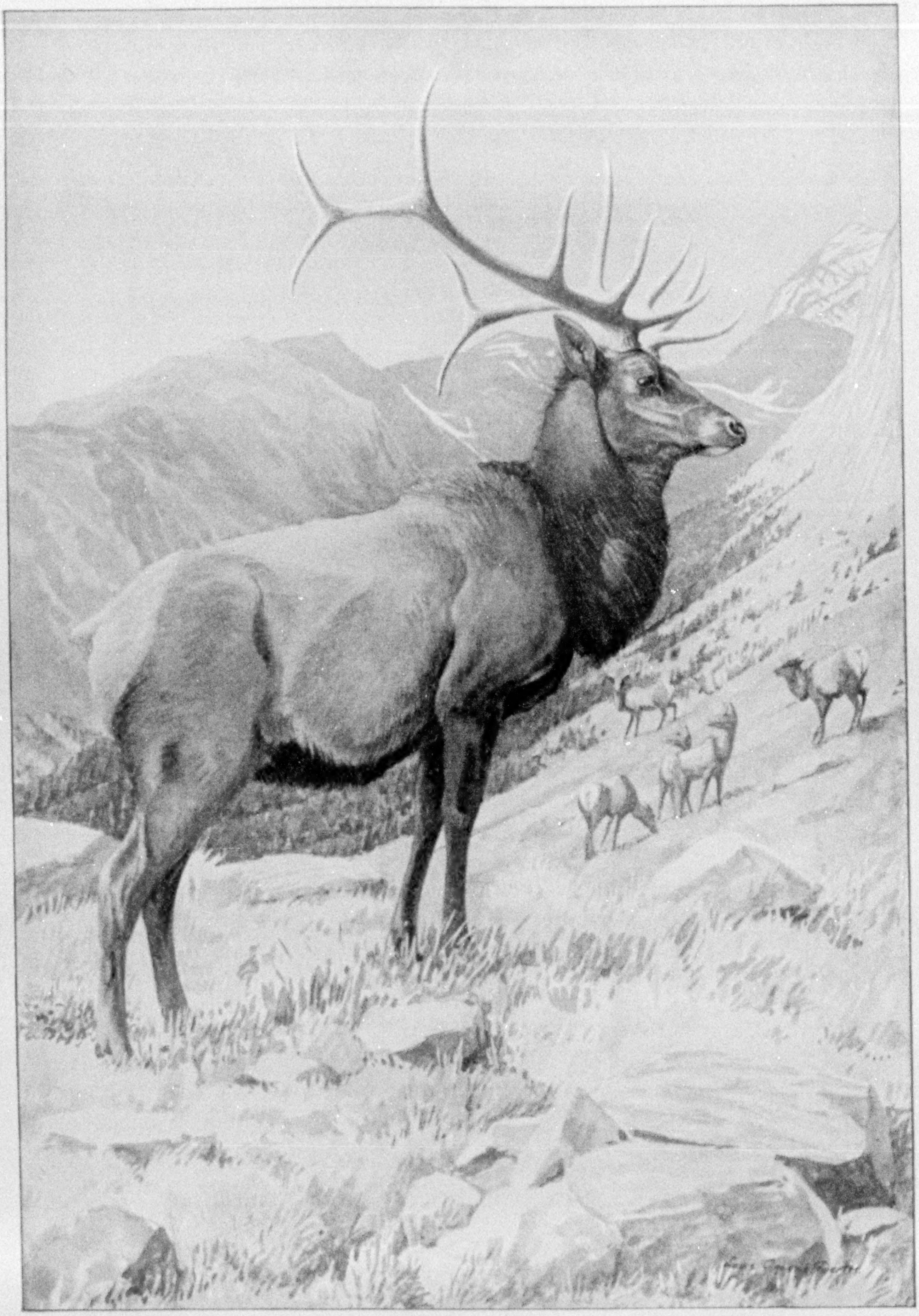
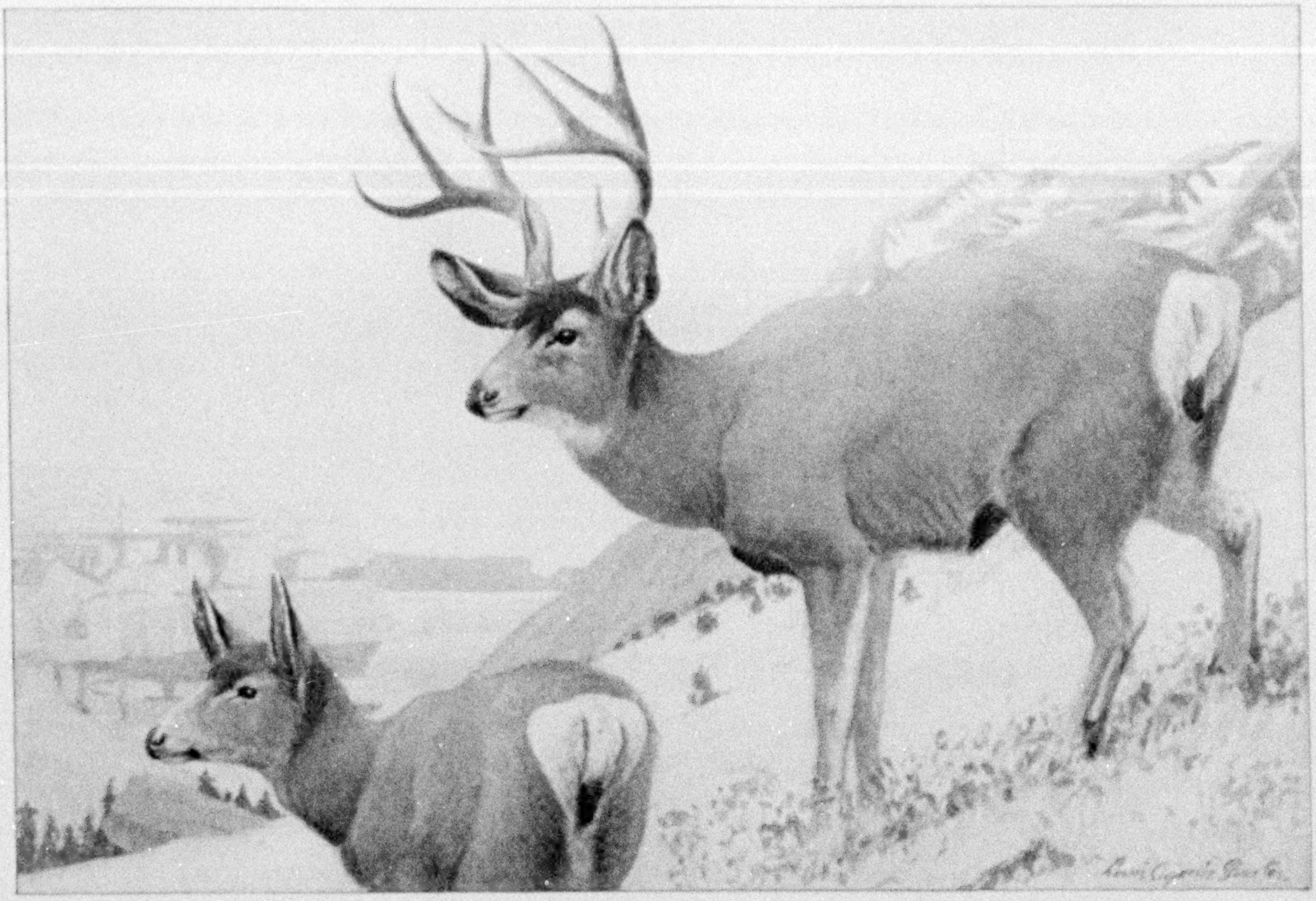
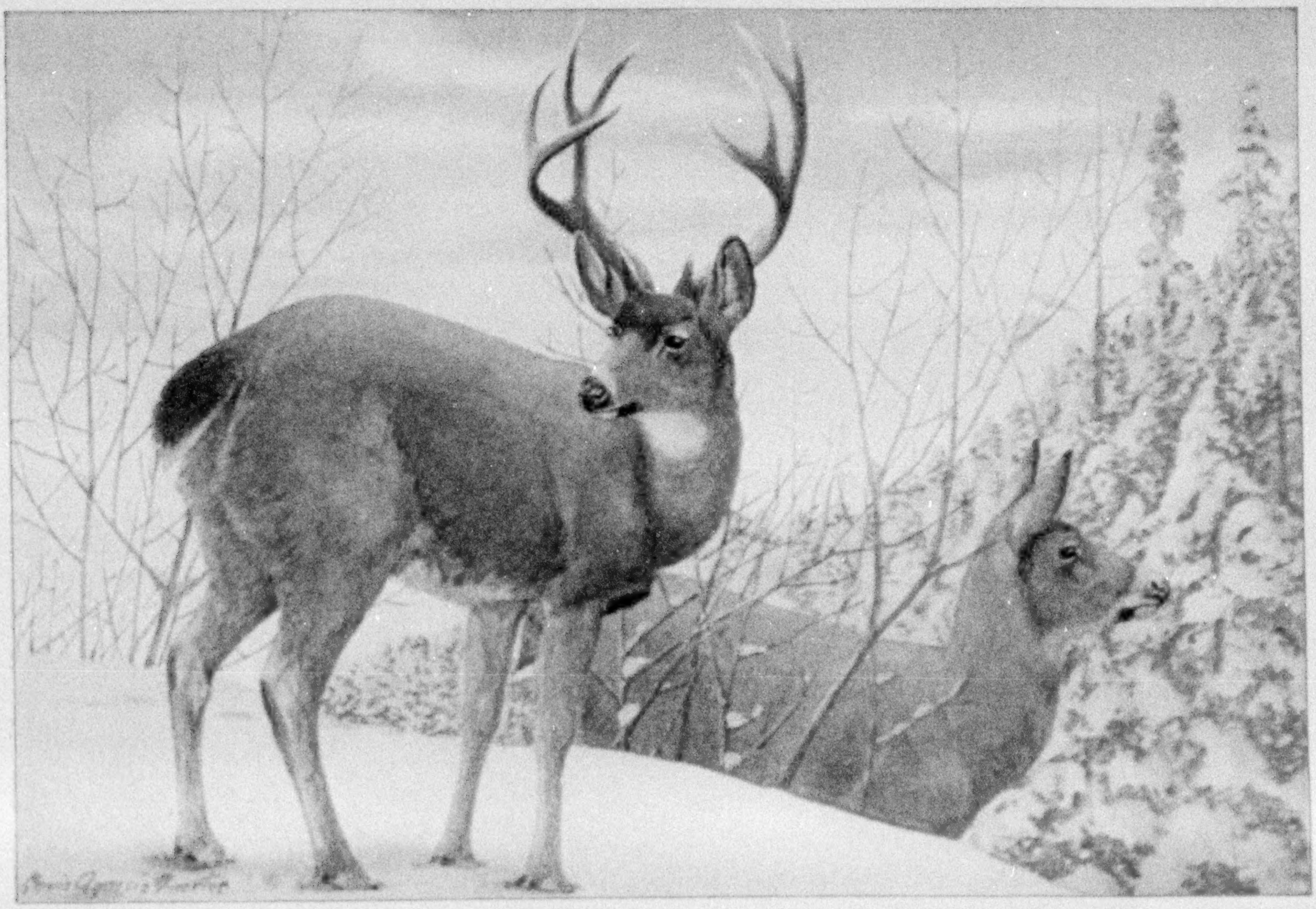


WAPITI, OR AMERICAN ELK



MULE DEER



BLACK-TAILED DEER

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table-land, and west to Lower California and the coast of California. Within these limits they inhabit different types of country, from the deciduous forests along streams on the eastern border of the Great Plains to the open pine forests of the high western mountains, the chaparral-covered hillsides of southern California, and the thickets of mesquites, acacias, and cactuses on the hot and arid plains of Sonora. Several geographic races of this deer have resulted from these varied conditions.

In spring in the Rocky Mountains the does leave the bands with which they have passed the winter and seek undisturbed retreats among forest glades or along scantily wooded slopes of canyons, where they have two or three handsomely spotted fawns with which they remain apart throughout the summer.

The bucks usually keep by themselves during the summer, in parties rarely exceeding ten. As their horns lose the velvet and the mating season draws near, the old bucks gather in bands of from six to ten.

At this time they are in perfect physical condition, and a band of them in the open forest, their antlers held proudly aloft and their glossy coats shining in the sun, presents a superb picture. They have little of the protective caution so characteristic of the white-tails, and when a shot is fired at a band they often begin a series of extraordinary "buck jumps," bounding high in the air, facing this way and that, sometimes not taking flight until after several additional shots have been fired. These high, bounding leaps are characteristic of mule deer and are commonly made when the animals are suddenly alarmed and often when they are in full flight through brushy thickets.

After the mating season, bucks and does join in bands, sometimes of fifteen or twenty, and descend to the foothills and sometimes even to the adjacent plains. Their preference, however, is for rough and broken country, such as that of canyon-cut mountains or the deeply scored badlands of the upper Missouri River.

These deer are not good runners in the open. On several occasions, on level country in Arizona, I have ridden after and readily overtaken parties of them within a mile, their heaving flanks and open mouths showing their distress. The moment rough country was reached, however, with amazing celerity a series of mighty leaps carried them away from me over declivities impossible for a horse.

The sight of a party of these splendid deer bounding away through the aisles of a mountain forest always quickens one's pulse and gives the finishing touch of wildness to the scene. Mule deer are characteristic animals of the beautiful open forests and forest parks of the Rocky Mountains and the high Sierras, where they may be perpetuated if given reasonable protection.

BLACK-TAILED DEER (Odocoileus columbianus and its subspecies)

In general appearance the black-tails have a close resemblance to the mule deer, but average smaller. They have the same large ears, forked tines to the antlers, and rather "stocky" body; but the brushy all-black tail distinguishes them from any other American deer. In color they have much the same shade of brown as the Virginia deer. They have the usual cycle of annual changes common to most American deer—assuming a dull coat in fall and losing their horns in winter, followed by the resumption of a brighter coat in spring and the renewal of their horns in summer.

The black-tails have one of the most restricted ranges among our deer. They are limited to the humid heavily forested belt along the Pacific coast from Juneau, Alaska, southward to the Coast range in central California. This coastal belt is characterized by superb growths of cedars, spruces, and firs in the north and by redwoods and firs in the south, uniting to make one of the most magnificent forest areas in the world. Here the deer live in the midst of rank undergrowths of gigantic ferns and other vegetation, as luxuriant in many places as that of the humid tropics.

Their home on the abruptly rising slopes of the islands in the Alaskan Archipelago is so restricted that both in summer and winter they fall an easy prey to native and white hunters. It has been reported that there has been much wasteful killing of the deer on these islands for commercial purposes. When the heavy snows of winter on the islands force the deer down to the shore, great numbers of them are also killed by wolves.

Black-tails commonly have two or three young, and this fecundity, combined with the effective protection given by the dense forest where many of them live, will aid in their perpetuation. At the same time they have not developed the mental alertness of the Virginia deer, and there is imminent need for prompt and effective action in safeguarding the deer in the Alaskan part of their range if their extermination on some of the islands is to be prevented. In this northern region the black-tails share their range with strange tribes of coastal Indians, whose huge sea-going canoes, totem poles, and artistic carvings are unique among native Americans.

VIRGINIA, OR WHITE-TAILED, DEER (Odocoileus virginianus and its subspecies)

The aptness of the name "white-tail" for the Virginia deer is obvious to any one who has startled one in the forest and seen it dash away with the tail upright and flashing vivid white signals at every leap. The adults have two strongly contrasted coats each year: brownish gray in winter and rusty red in summer. The fawns, usually two in number, are dull rusty brown, marked with a series of large white spots, which remain until the gray winter coat is assumed in the fall. Large bucks sometimes attain a weight of more than 300 pounds.

The white-tail is the well-known deer of all the forest areas in eastern North America. With its close relatives, it ranges from northern Ontario to Florida and from the Atlantic coast to the Great Plains; also in the Rocky Mountains south to New Mexico, and in the Cascades and Sierra Nevada to northern California.

The supreme importance of this deer to the early settlers of the Eastern States is made plain in all the literature covering the occupation of that region. Its flesh was one of the most reliable staples in the food supply, and not infrequently was the only resource against starvation. In addition, the tanned skins served for clothing and the sinews for thread. Many of the most striking and romantic characters in our early history appear clad in buckskin, from fringed hunting shirt to beaded moccasins.

As no other American game animal equaled the white-tail in economic value to the settlers, so even to-day it remains the greatest game asset in many of the Eastern States. Partly through protective laws and partly through its acute intelligence and adaptability, the Virginia deer continues to hold its own in suitable woodland areas throughout most of its former range, and in recent years has pushed hundreds of miles northward into new territory in Ontario and Quebec.

Even in the oldest and most densely populated States, as New York and Massachusetts, white-tails still exist in surprising numbers. Over 7,000 were killed during the hunting season of 1915 in Maine, and an average of about 2,800 are killed yearly in Vermont. The great recreational value of the white-tail to a host of sportsmen is obvious. To the growing multitude of nature lovers the knowledge that a forest is inhabited by deer immediately endows it with a delightful and mysterious charm.

In summer white-tails are usually solitary or wander through the forest in parties of two or three. In winter, where the snowfall is heavy, they gather in parties, sometimes of considerable size, in dense deciduous growth, where food is plentiful. There they remain throughout the season, forming a "yard" by keeping a network of hard-beaten paths open through the snow in order to reach the browse afforded by the bushes and trees.

Ordinarily Virginia deer are shy and elusive habitants of dense forests, where they evade the unpracticed intruder like noiseless shadows. Where they are strictly protected for a period of years under State laws, they become surprisingly confident and often damage young orchards and crops on farms near their haunts. Several States pay for the damage thus done. Happily this attractive species thrives so well under protective laws that its continued future in our forests appears to be assured.

ARIZONA WHITE-TAILED DEER

(Odocoileus couesi)

The Arizona white-tails are slight and graceful animals, like pigmy Virginia deer, so small that hunters often ride into camp with a full-grown buck tied back of the saddle. They have two seasonal pelages—gray in winter and more rusty brown in summer. The antlers, very small, but in form similar to those of the Virginia deer, are shed in winter and renewed before the end of summer.

These handsome little deer, the smallest of our white-tails, are common in many of the wooded mountains of middle and southern Arizona, southern New Mexico, western Texas, and in the Sierra Madre of Chihuahua and Sonora, Mexico. By a curious coincidence this area was the ancient home of the Apache Indians and has had one of the most tragic histories of our western frontier.

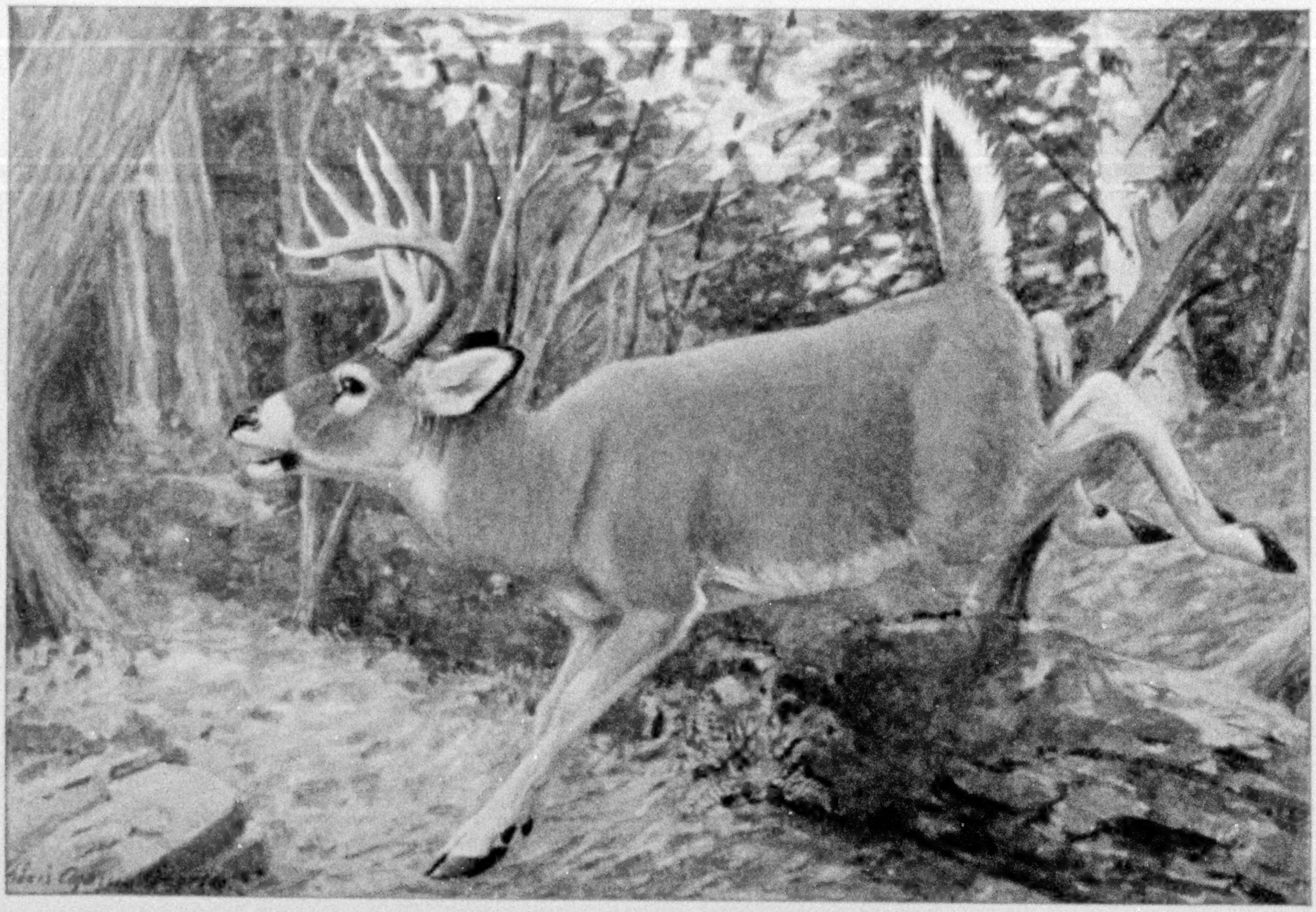
During summer and early fall in the higher ranges small bands of Arizona white-tails occupy the lower parts of the yellow-pine forests, between 6,000 and 9,000 feet altitude, where they frequent thickets of small deciduous growth about the heads of canyons and gulches. As winter approaches and heavy snowstorms begin, they descend to warm canyon slopes to pass the season among an abundant growth of pinyons, junipers, oaks, and a variety of brushwood.

In the White Mountains of Arizona, between the years 1883 and 1890, when wild life was more abundant than at present, I often saw, on their wintering grounds, large herds of these graceful deer, numbering from 20 to more than 100 individuals. Such gatherings presented the most interesting and exciting sight, whether the animals were feeding in unconscious security or streaming in full flight along the numberless little trails that lined the steep slopes. Where these deer live on the more barren and brush-grown tops of some of the desert mountains in southwestern Arizona and Sonora, the snowfall is so light that their summer and winter range is practically the same.

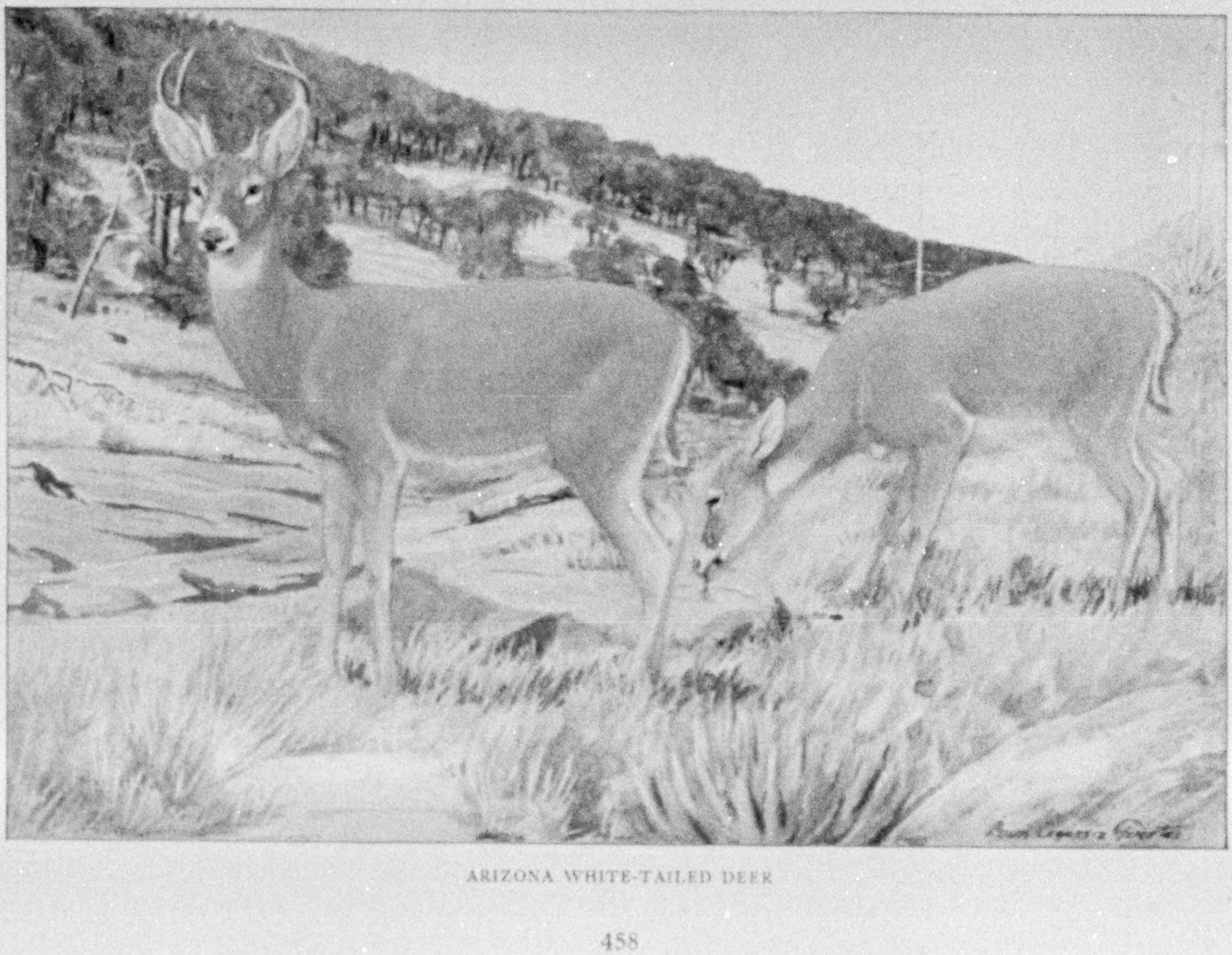
Although far more gregarious than our other white-tails, the herds of Arizona deer break up in early spring. At this time one or two fawns are born, amid early flowers in the charming vistas of the open forest. Very young fawns are hidden in rank vegetation and sometimes left temporarily by their mothers. If a horseman chances by the fawns may rise and follow innocently at the horse's heels. On such occasions I have had difficulty in driving them back to prevent their becoming lost.

In the Sierra Madre of Chihuahua one summer I found these little white-tails occupying "forms," like rabbits, located in the sheltering matted tops of fallen pine trees which had been overthrown by spring storms. In these shelters they rested during the middle of the day, secure from the wolves and mountain lions which prowled about the canyon slopes in search of prey.

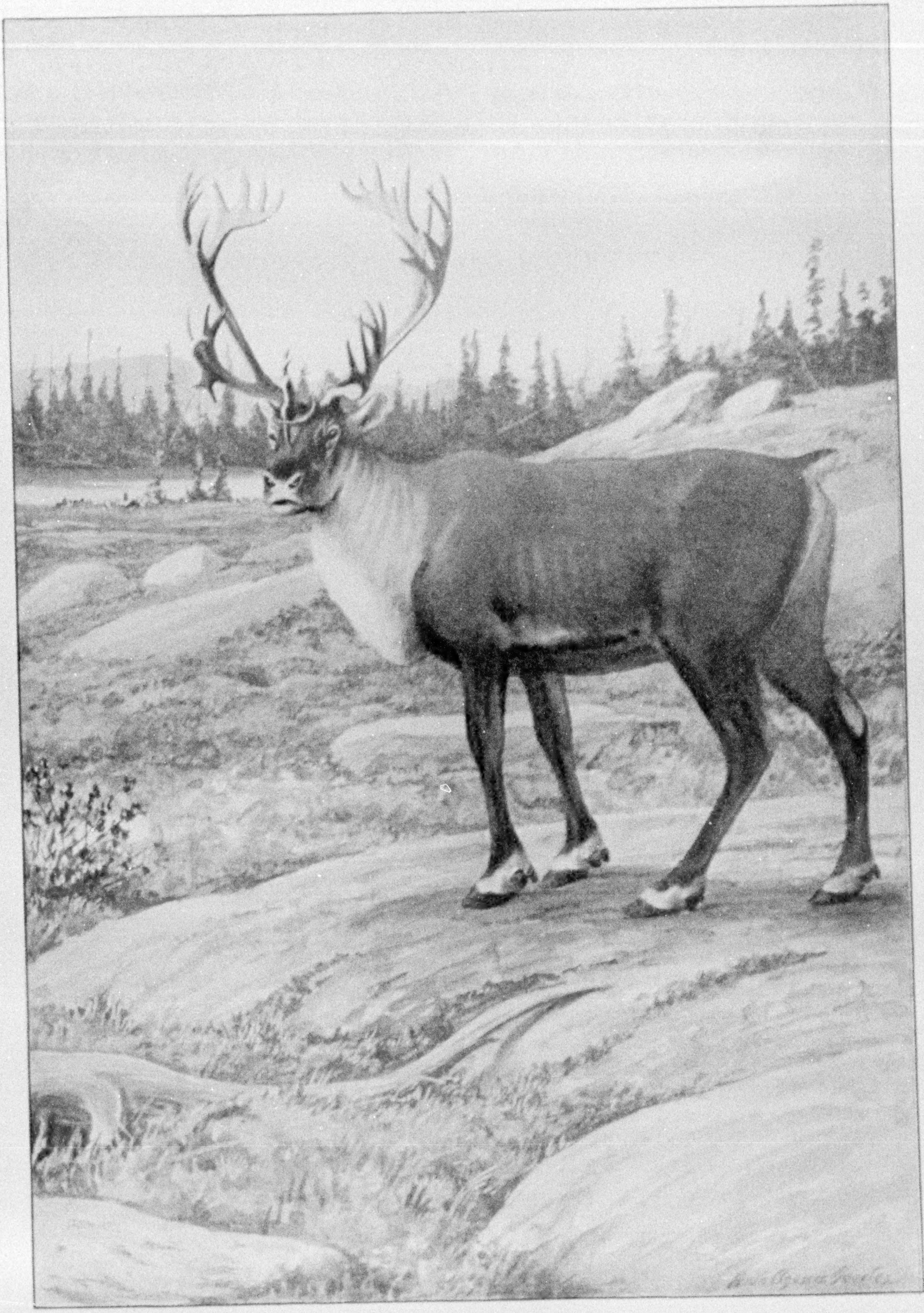
With the growing occupation of their territory by cattle and sheep and the increase in the number of hunters, these once abundant deer are rapidly diminishing. It is high time more careful measures be taken for their conservation, else extermination awaits them throughout most of their original haunts.



VIRGINIA, OR WHITE-TAILED, DEER



ARIZONA WHITE-TAILED DEER



WOODLAND CARIBOU

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WOODLAND CARIBOU (Rangifer caribou and its subspecies)

The caribou lacks the symmetry and grace of the true deer. Its large head topped with irregular antlers, heavy body, and thick, sturdy legs, ending in large, broad-spreading hoofs, produce a distinctly ungainly animal. It is the only member of the deer family in which both sexes have antlers, those of the female being smaller and slenderer than those of the male. It varies in size in different parts of its range, but large old bulls usually weigh from 300 to 400 pounds. A single calf is the rule, but occasionally there are two.

The woodland caribou, the southern representative of the barren ground caribou, inhabits almost the same northern forest of spruce, tamarack, birch, and alder as those sheltering the moose. It ranges from the northern border of the forests in Alaska and Canada south to Maine, northern Minnesota, northern Idaho, and British Columbia. It is far less gregarious than the barren ground caribou, during summer only small parties of cows, calves, and partly grown young keeping together, while the bulls are solitary or in still smaller separate parties. In winter all unite in larger herds.

The curiously ungraceful appearance of the caribou, so different from other deer, gives it a strong individuality, which seems to belong with its remote haunts in the wilderness. This great animal has an added appeal to our interest, owing to its close relationship to that other woodland caribou which was such an important resource to the cave-men of France and other parts of Europe, as shown by bone and horn implements, carvings, and other records discovered in their homes.

During summer and fall in eastern Canada, where this caribou is distributed through much of the wilder forests, it has a habit of coming out of the woods to sun itself and bathe on the borders of shallow lakes. Here the old bulls wallow in the water, and on rising shake themselves like a dog, filling the air with a halo of sparkling water drops. In such places the bulls frequently stand basking in the sun for hours. To a canoeman gliding silently around a jutting point, this rugged habitant of the wilds, discovered across the shining waters, standing outlined against the dark green forest, represents a wonderfully picturesque sight. When alarmed at such times the caribou dashes shoreward through the water amid clouds of flying spray struck up by its broad feet and vanishes in the sheltering forest, accompanied by a loud crashing of dry branches.

The woodland caribou is neither so swift nor so astute in avoiding danger as the Virginia deer or the moose. It falls an easy prey to hunters and to wolves, and when not properly safeguarded is readily exterminated. This is shown by its complete disappearance from the Adirondacks, in northern New York, and by its threatened disappearance from the forests of Maine, Minnesota, and Idaho; in fact, the woodland caribou is in more imminent danger of complete and early extermination within the United States than any other game animal and can be saved only by stringent laws and careful guardianship.

BARREN GROUND CARIBOU (Rangifer arcticus and its subspecies) (see illustration, page 422)

The typical barren ground caribou is smaller and paler colored than the woodland species. Several geographic races have been distinguished, among which the most notable is the Peary caribou, the palest of all and the subject of the accompanying drawing. Like other members of the group, this species is a heavily built animal, with thick legs and large feet.

The barren ground caribou is characteristic of the desolate Arctic barrens and tundras beyond the limit of trees, ranging to the northernmost limit of land beyond 83 degrees of latitude. When explorers first visited these northern wilds, including the treeless coastal belt from the Peninsula of Alaska to Bering Straits, they found these animals almost everywhere in extraordinary abundance. Over great areas of this territory straggling herds of caribou, sometimes numbering hundreds of thousands, drifted with the season from one feeding ground to another.

The advent of white men with guns has resulted in their rapid decrease everywhere and in their extermination over great areas. In many of their old haunts the only trace of their former abundance is in well-marked trails winding by easy grades to the bare tops of the low mountains. They are still numerous on the Peninsula of Alaska and in much greater numbers in parts of the barren grounds of Canada. There, on the shores of Artillery Lake, during the summer of 1907 a small migrating herd of about 2,000 was seen.

When alarmed these caribou often break into a clumsy gallop, which soon changes to a steady shambling trot, their characteristic gait, carrying them rapidly across country. In winter their tracks in the snow show that their feet, instead of being raised high at each step, like those of a Virginia or mule deer, drag through the snow like those of domestic cattle. Their large, broad-spreading hoofs, with sharp, cup-shaped edges, are admirably adapted to secure a firm footing in the yielding and hummocky surface of their haunts in summer and on the snow and ice in winter.

The barren ground caribou, living under severe climatic conditions, has developed an extraordinary method of storing up fat to carry it through winter stresses. Early in fall a layer of pure tallow, called "backfat," is formed over the entire top of the back from between the shoulders to the rump. This is a solid slab of tallow lying between the superficial muscles and the skin. It is almost as thin as a knife-blade at the shoulders, but thickens gradually to a depth of from 4 to 6 inches at the rump. This slab of tallow is gradually absorbed during the winter and has totally disappeared by spring. In early winter the "backfat" is easily removed and transported in its original form. It is highly prized for food and as an article of trade among the Eskimo and Indian hunters, and figures as one of the chief delicacies at their winter feasts.

The Peary caribou lives in Ellesmere, Grinnell, and other of the northernmost Arctic lands to beyond 83 degrees of north latitude, where in places it is common. It appears to thrive on moss, lichens, and other dwarf and scanty Arctic vegetation, and holds its own against the depredations of packs of the white Arctic wolves. In these northern wilds, amid the most intense cold, the caribou passes from three to five months of continuous night, its wanderings lighted only by the moon, stars, and the marvelous displays of waving northern lights.

Tame reindeer, which are kept by the people of the Arctic border of the Old World from Lapland to Bering Straits, are domesticated descendants of the barren ground caribou of that region. They are used by their owners to pack burdens and haul sledges as well as to supply them with food and clothing. These animals have been successfully introduced in Alaska, and both natives and white men are developing this new and promising stock industry. The herds of tame reindeer are extremely gentle and easily handled. Their progenitors were like other wild caribou—of a dull and nearly uniform color—but domestication has resulted, as with cattle, in producing endless color variations, from white to black, with every imaginable piebald variation.

The changed conditions of life in Alaska, due to the recent development of that territory, have seriously affected the welfare of the natives. Fortunately the introduction of reindeer herds appears to open a promising future for both Eskimos and Indians.

MOOSE (**Alces americanus** and its subspecies)

The American moose is a large cousin of the elk of the northern forests of Europe and Siberia. The Old World animal is characterized not only by its smaller size, but also by smaller antlers. The moose is a large, grotesquely formed animal, with the most impressive individuality of any of our large game. Its great head, with oddly formed nose, huge palmated antlers, pendulous bell under the neck, short body, and disproportionately long legs unite to lend the impression that it may be a strange survivor from some remote geologic period.

The moose inhabits our northern forests, where it wanders among thickets of spruce, tamarack, birch, aspen, and alder, from the mouth of the Yukon and the lower Mackenzie southward to Maine, northern Minnesota, and down the Rocky Mountains to Wyoming. It varies in size in different parts of its range. The bulls of the Kenai Peninsula and adjacent region in Alaska are the largest of their kind in the world, sometimes weighing more than 1,400 pounds. The enormous antlers of these great northern beasts attain a spread of more than six feet and make the most impressive trophy the big-game hunter can secure in America.

Although taller than an ordinary horse, weighing more than half a ton, and adorned with wide-spreading antlers, the bull moose stalks with ghostly silence through thickset forests, where man can scarcely move without being betrayed by the loud crackling of dry twigs. In summer it loves low-lying, swampy forests interspersed with shallow lakes and sluggish streams. In such places it often wades up to its neck in a lake to feed on succulent water plants, and when reaching to the bottom becomes entirely submerged. These visits to the water are sometimes by day, but usually by night, especially during the season when the calves are young and the horns of the bulls are but partly grown.

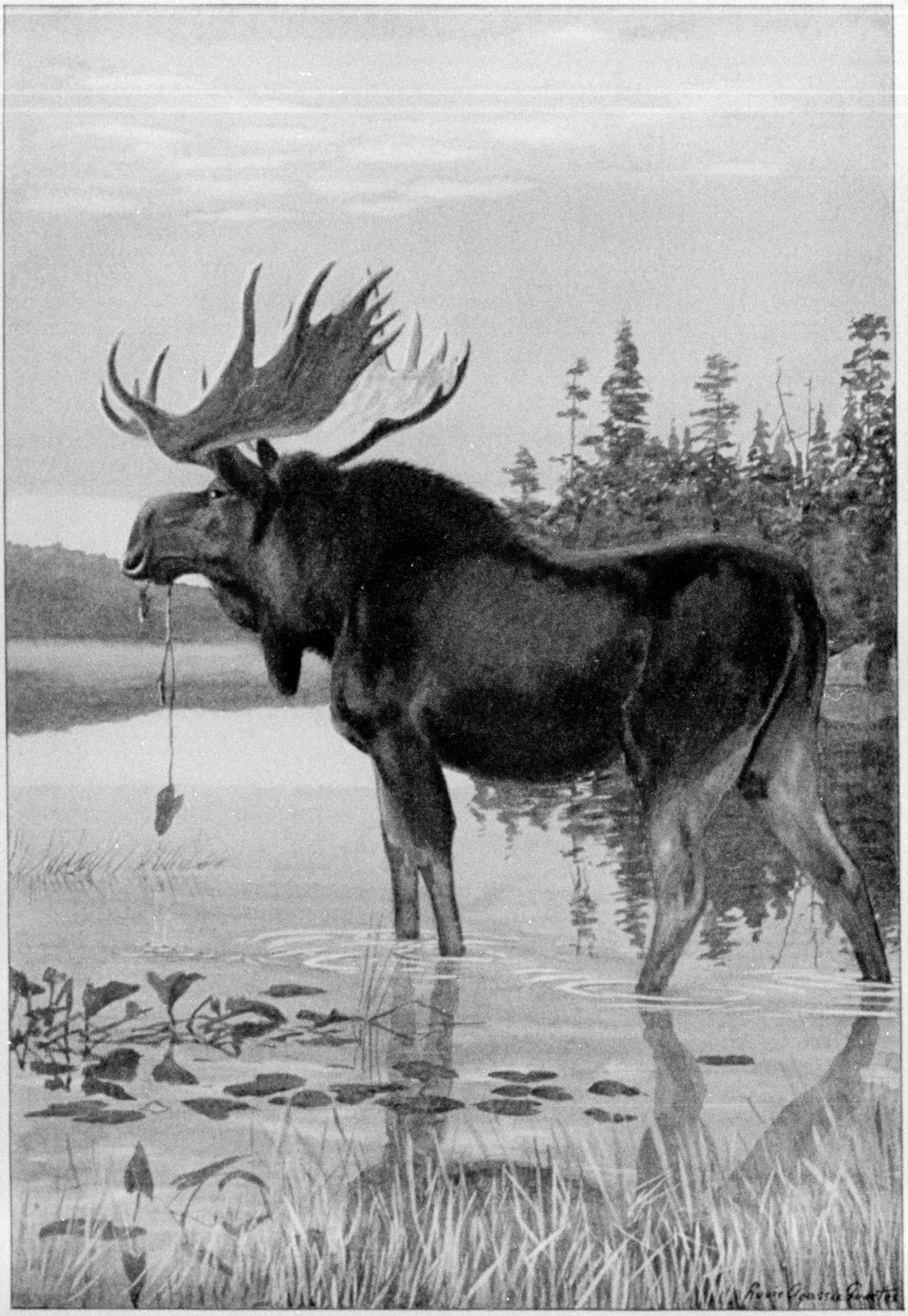
Late in the fall, with full-grown antlers, the bulls wander through the forest looking for their mates, at times uttering far-reaching calls of defiance to all rivals, and occasionally clashing their horns against the saplings in exuberance of masterful vigor. Other bulls at times accept the challenge and hasten to meet the rival for a battle royal. At this season the call of the cow moose also brings the nearest bulls quickly to her side. Hunters take advantage of this, and by imitating the call through a birch-bark trumpet bring the most aggressive bulls to their doom.

Ordinarily moose are extremely shy, but during the mating season the males become so bold that when encountered at close range they have been known furiously to charge a hunter. They strike vicious blows with their front feet, as well as with their heavy antlers, and make dangerous foes for man or beast.

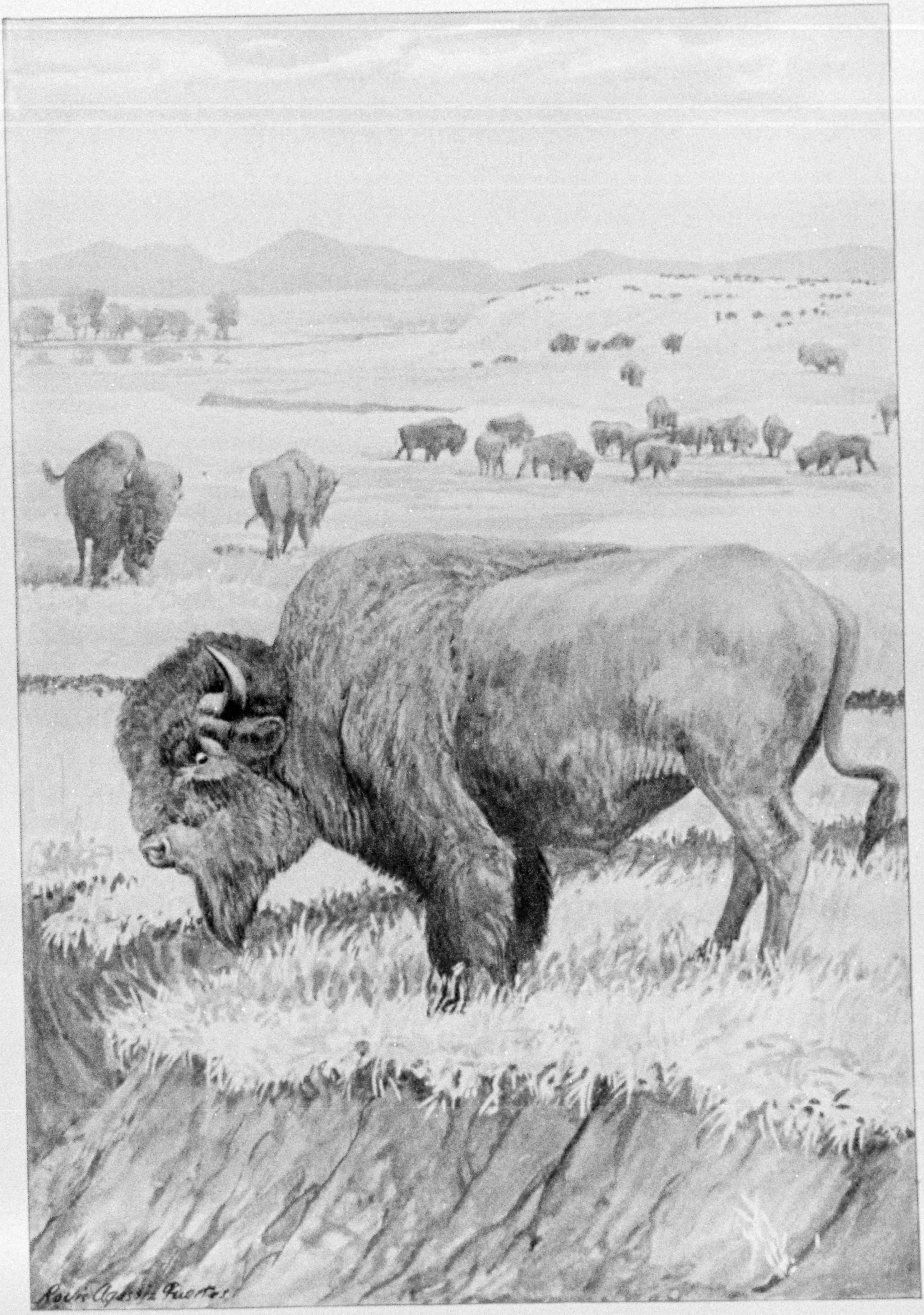
Moose have disappeared from the Adirondacks and have become scarce in many districts where once plentiful. Through wise protection they are still numerous about the head of Yellowstone Lake, and are still among the available game animals of Maine and the eastern provinces of Canada. Indeed, during the last few years they have steadily extended their range in northern Ontario and British Columbia. They occupy great areas of little-visited wilderness, which are becoming more and more accessible; as a result the future existence of these superb animals depends upon their receiving proper protection.

AMERICAN BISON (**Bison bison** and its subspecies)

The American bison, or buffalo, is a close relative of the larger bison which once inhabited Europe and survives in limited numbers in certain game preserves of Poland and the Caucasus. The size, dark shaggy coat, great head, and high arched shoulders of our bison give them a unique individuality among American big game. They once roamed in vast numbers over a broad territory, extending from Great Slave Lake, Canada, south to southern New Mexico, and from Pennsylvania and eastern Georgia to Arizona and northern Nevada. It



MOOSE


Louis Agassiz Fuertes

AMERICAN BISON, OR BUFFALO

XUM

is thus evident that they were at home in the forested country east of the Mississippi River, as well as on the treeless plains of the West. In the northern part of their range they are larger and darker than elsewhere and form a local geographic race called the wood buffalo.

Originally buffalo were enormously abundant in America, and it has been variously estimated that when the continent was first discovered their numbers were from 30,000,000 to 60,000,000. With the settlement of eastern America, they gradually retreated across the Mississippi River, but continued to exist in great but rapidly diminishing numbers on the Great Plains up to within the last fifty years.

The crossing of their range by the first transcontinental railroad quickly brought the remaining herds to an end. In 1870 there were still about 5,500,000 head on the plains, but these were so wastefully slaughtered for their hides that in 1895 only about 800 remained. The depletion of the herds was so startling that sportsmen and nature lovers awoke to the danger of the immediate extermination of these splendid animals; the American Bison Society was organized and the surviving buffalo were saved.

Although the bison usually has but a single calf a year, these are so hardy and do so well in fenced preserves, and even in the closer confinement of small parks, that their number has now increased to approximately 4,000, about equally divided between the United States and Canada. In the district south of Artillery Lake, northern Canada, a few hundred individuals, remnants of the wild stock of that region, survive and are increasing under the wise protection of the Canadian Government. The only other herd still existing on its original ground is that in Yellowstone National Park.

Experiments have been made in crossing buffalo with certain breeds of domestic cattle for the purpose of establishing a new and hardier variety of stock for the Western ranges. These have not proved successful, largely owing to the lack of fertility in the hybrid, which has been called the "cattalo."

Under primitive conditions, buffalo herds numbering millions of animals regularly migrated in spring and fall from one feeding ground to another, often traveling hundreds of miles for this purpose. The herds followed the same routes year after year and made lasting trails, often from two to three feet in depth. Investigation has shown that many of our highways, and even some of our main railway lines, seeking the most convenient grades, follow trails laid down by these early pathfinders. When a great migrating herd was stampeded, the thunder of its countless hoofs shook the earth, and in its flight it rushed like a huge black torrent over the landscape.

The buffalo was the most important game animal to the Indians over a great area. Several tribes were mainly dependent upon these animals for food and clothing and the entire tribal economy was built about them. The mode of life, customs, and folk-lore of the Indians all centered about these animals. Their clothing and tepee covers were made of the skins. The tanned skins also served as individual and tribal records of the warrior-hunters, the chronicles being drawn in picture-writing on the smooth surfaces. The passing of the buffalo on the free sweep of the western plains ended forever one of the most picturesque phases of aboriginal life in America.

MUSK-OX (Ovibos moschatus and its subspecies)

The musk-ox is one of the unique and most interesting of American game animals. In general appearance it suggests a small, odd kind of buffalo, and is, in fact, related to both cattle and sheep. It is a heavily built, round-bodied animal, with short, strong legs and long fringelike hair which hangs so low on the sides that it sometimes trails on the snow. The horns—broad, flat, and massive at the base—curve down and out to a sharp point on each side of the head and form very effective weapons for defense.

Fossil remains prove that musk-oxen lived in northern Europe and Asia during Pleistocene times, but they have long been confined to Arctic America. Up to within a century they have occupied nearly all of the cheerless wilds north of the limit of trees, from the coast of northern Alaska to that of east Greenland. They appear to have become extinct in northern Alaska within the last 75 years, and their present range east of the Mackenzie River is becoming more and more restricted.

They are now limited to that part of the barren grounds of Canada lying north and northwest of Hudson Bay and from the Arctic islands northward and eastward to the northern coast of Greenland. Their range extends to beyond 83 degrees of latitude and covers some of the bleakest and most inhospitable lands of the globe. There a short summer, with weeks of continuous sunshine, permits the growth of a dwarfed and scanty Arctic vegetation; but winter brings a long period of night, continuous, in the northernmost parts, through several months.

Under such rigorous conditions musk-oxen thrive unless hunted by civilized man. They are strongly gregarious, usually traveling in herds of from six to twenty, but herds containing about 100 have been recorded. Their eyesight is not strong, but their sense of smell is good, and when danger is suspected they dash away with great celerity for such heavily formed animals. If rocky ground is near, they seek refuge in it and ascend steep, broken slopes with astonishing agility.

When brought to bay, the herd forms a circle about the calves and, with heads out, presents to the enemy an unbroken front of sharp horns. So long as the circle remains unbroken such a defense is extremely effective against both dogs and wolves. The only natural enemies of musk-oxen are wolves, and against these and the primitive weapons of the Eskimos they hold their own very well.

When the Greely Expedition landed at Lady Franklin Bay in 1881, musk-oxen were encountered and killed practically on the site where winter quarters were established. Since then several exploring and hunting parties have taken heavy toll from the herds of that region. Some accounts of the wholesale killings do not make pleasant reading for one who desires the perpetuation of our native species. Fortunately for the musk-oxen, the adventurers of these northern quests are few and far between, so that on departing they leave the game animals in their vast solitudes to recuperate from these onslaughts.

Musk-oxen have but a single young, so that between depredations of wolves and overkilling by white and native hunters these animals face the very real danger of extermination threatening so many other game animals in the far North. For this reason, it is hoped that sportsmen who visit these remote game fields will restrain a desire for making large bags.

FLORIDA MANATI (Trichechus latirostris)

The manatis, or manatees, are strange aquatic mammals, with seal-like heads and whalelike bodies. Compared with whales, their flippers are more flexible at the joints, and thus can be used much more freely. They have very small eyes and a heavy upper lip, deeply cleft in the middle and forming a thick lobe on each side. The skin is hairless and covered with fine wrinkles.

These animals inhabit the rivers entering the sea and shallow coastal lagoons on both sides of the Atlantic, in tropical parts of West Africa and of eastern North and South America. The South American species ascends the Amazon and its tributaries well up toward their headwaters.

The Florida manati regularly frequents the coast from eastern Florida to Mexico, Central America, and the West Indies; in summer it sometimes strays as far north as the coast of Virginia.

This species attains an extreme length of more than 15 feet and a weight of more than 1,500 pounds, but the average size is much less. A large specimen exhibited alive at New Orleans the winter of 1912 weighed 1,310 pounds and is reported to have eaten daily from 60 to 100 pounds of grass. One captured near Point Isabel, Texas, measured a few inches more than 15 feet in length.

Manatis were formerly plentiful in the Indian River and elsewhere along the Florida coast, but were shot and netted to the verge of extermination. They were killed not only for amusement by thoughtless sportsmen, but many were killed by residents for their flesh, which was salted down like beef for future use. The flesh is said to be well flavored and not unlike beef.

The imminent danger of the extermination of these curious animals and their evident value for the interest they lend the coastal waters of the State led to the passage of protective laws with a penalty of $500. As a result of this, manatis have increased rapidly. A correspondent, writing on June 20, 1916, from Ponce Park, on Indian River, says that at this season scarcely an hour in the day passes but that from one to half a dozen may be seen in front of his house. He adds that one with a "calf" about 3 feet long keeps about his dock all the time. In this vicinity manatis appear to be migratory, leaving about the first of December and returning in early spring, the first one noted in 1916 appearing on March 26. They are extremely susceptible to cold, as was demonstrated by the number which perished in Indian River near Micco, February 12, 1895, when the temperature fell to 20° Fahrenheit. They are known to winter in Biscayne Bay and elsewhere in southern Florida.

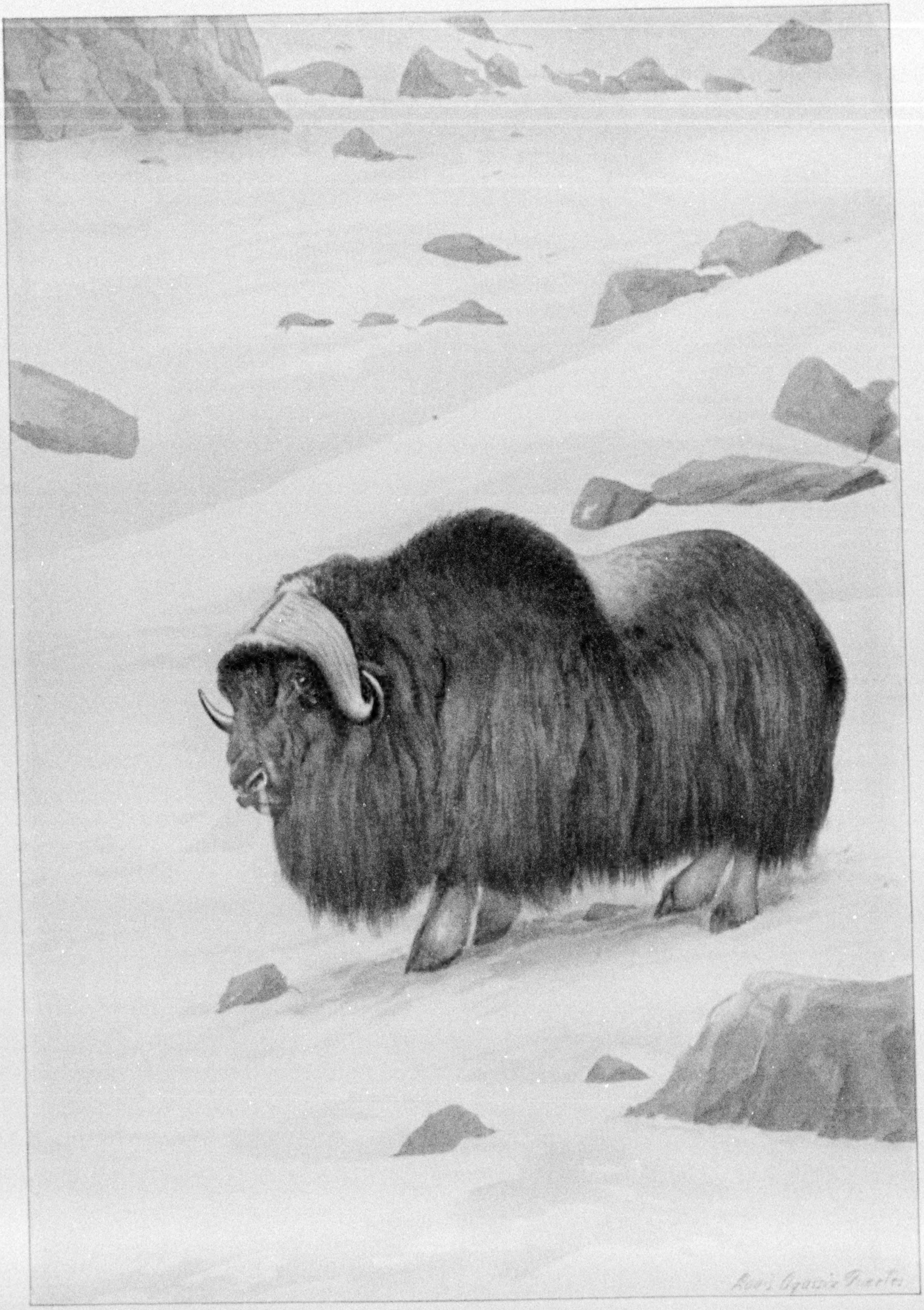
Within a few weeks after the manatis return to the vicinity of Ponce Park the young are born. Just before this the females are said to seek the protection of a dock, crib, or bridge, possibly in order that the new-born young may be safe from the sharks and sawfish which abound in these waters. Usually there is only one calf, which is about 30 inches long, but sometimes the mother is seen accompanied by two. During this season the females are scattered and, with their young, keep in comparatively shoal water near the shore, and not infrequently lie in shallow pools with half their bodies exposed. Later in the season they gather in herds and often 15 to 20 may be seen close together. At such times they roll about and make a great turmoil in the water. The Mexicans on the coast of southern Vera Cruz described to me similar summer gatherings of manatis in small lagoons and claimed they were there for the purpose of mating.

In fall, near Ponce Park, the larger animals, probably the old males, separate from the herds and roam about singly. At this time they often make a peculiar noise like a loud snort, which may be heard for half a mile or more.

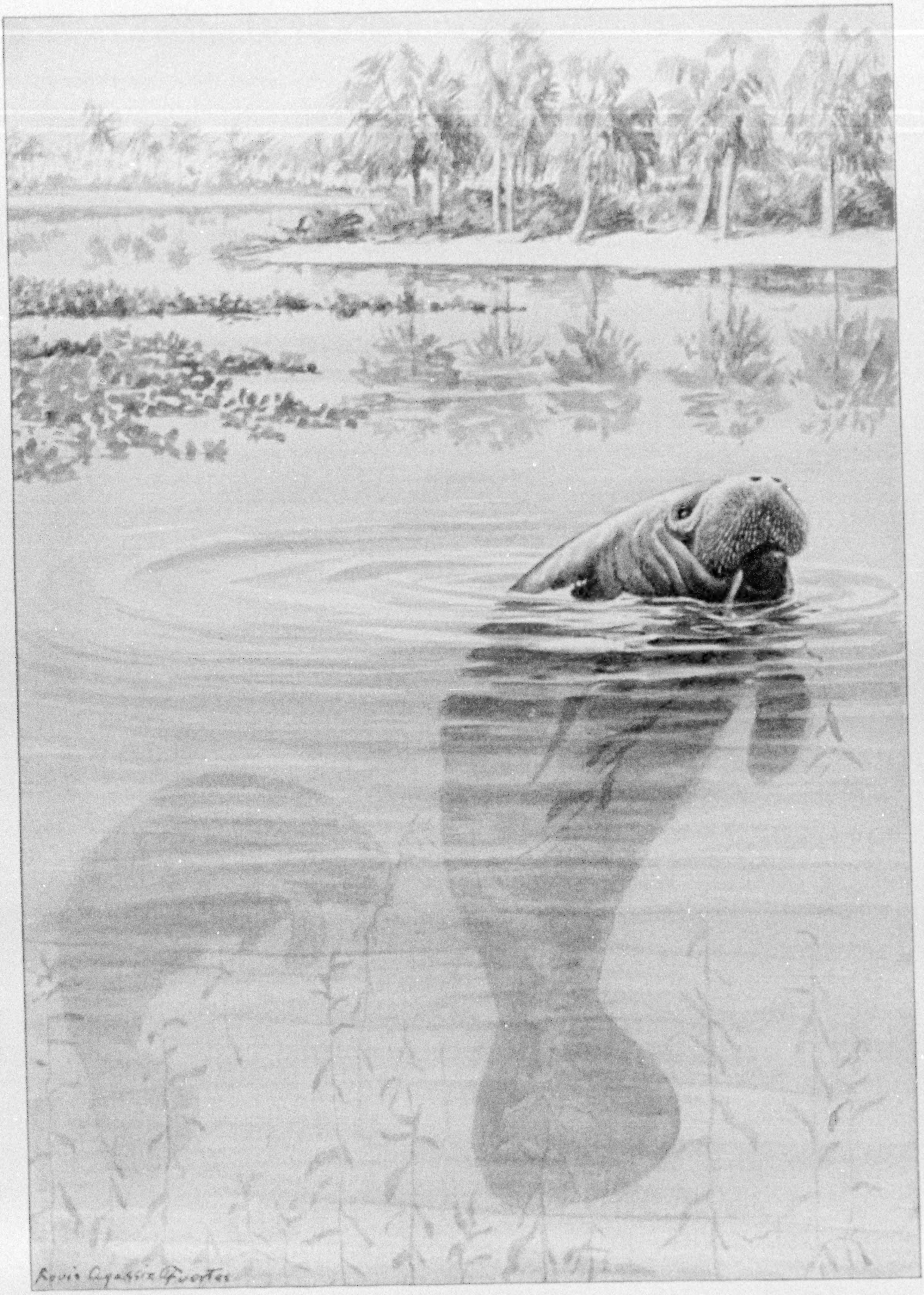
The Florida manatis are extremely mild and inoffensive animals, seeming never to fight one another, nor to show aggressiveness of any kind. When not molested they are very gentle and will feed close about a boat or dock regardless of the presence of people, but they become alarmed by any sudden noise. In captivity they soon learn to eat from their captor's hands.

Manatis are sluggish, stupid animals, without other defense than their size. They are not rapid swimmers and are among the extremely few herbivorous aquatic mammals. Unlike seals, whales, and their allies, which feed upon some form of animal life, manatis feed on the lush grasses and other vegetation springing from the oozy bottom of the waters they frequent. When feeding on the bottom they use their flippers to help move slowly about. In places along the Indian River they are reported to approach the shore and, with head and shoulders out of water, to feed on heavy grass-like plants hanging from the banks.

While they are feeding the heavy bi-lobed upper lips work freely and are sufficiently prehensile to seize the grass, or other plant food, between the lobes and thrust it back into the



MUSK-OX


Louis Agassiz Fuertes

FLORIDA MANATI

XUM

mouth. The ends of the flippers are sometimes used to help convey food to the mouth, like huge hands in thumbless mittens.

When suckling her young the manati rises to the surface, her head and shoulders out of the water, and with her flippers holds the nursling partly clasped to her breast. This semi-human attitude, together with the rounded head and fishlike tail, may have furnished the basis on which the ancients built their legends of the mermaids.

KILLER WHALE (Orcinus orca)

The killer whale is a habitant of all oceans from the border of the Arctic ice fields to the stormy glacial margin of the Antarctic continent. So far as definitely known, there appears to be but a single species. It attains an extreme length of approximately 30 feet and is mainly black with well-defined white areas on the sides and underparts of the body. Its most striking and picturesque characteristic is the large black fin, several feet long, standing upright on the middle of the back.

The killer usually travels and hunts in "schools" or packs of from three to a dozen or more individuals. Unlike most whales, the members of these schools do not travel in a straggling party, but swim side by side, their movements as regularly timed as those of soldiers. A regularly spaced row of advancing long black fins swiftly cutting the undulating surface of the sea produces a singularly sinister effect. The evil impression is well justified, since killers are the most savage and remorseless of whales. The jaws are armed with rows of effective teeth, with which the animals attack and devour seals and porpoises, and even destroy some of the larger whales.

Killers are like giant wolves of the sea, and their ferocity strikes terror to the other warm-blooded inhabitants of the deep. The Eskimos of the Alaskan coast of Bering Sea consider killers as actual wolves in sea form. They believe that in the early days, when the world was young and men and animals could change their forms at will, land wolves often went to the edge of the shore ice and changed to killer whales, and the killers returned to the edge of the ice and climbed out as wolves, to go ravening over the land. Some of the natives assured me that even today certain wolves and killers are still endowed with this power and, on account of their malignant character, are much feared by hunters.

Killers are known to swallow small seals and porpoises entire and attack large whales by tearing away their fleshy lips and tongues. When attacking large prey they work in packs, with all the unity and fierceness of so many wolves. The natives of the Aleutian Islands told me that large skin boats are sometimes lost in the passes between the islands by sea-lions leaping upon them in their frenzied efforts to escape the pursuit of killer whales.

The killers are specially detrimental to the fur-seal industry, owing to their habit of preying upon seals during their migrations in the North Pacific and during the summer in Bering Sea. They also haunt the waters about the Fur Seal Islands to continue their depredations during the summer. It would be a wise conservation measure for the Federal Government to have these destructive beasts persistently hunted and destroyed each spring and summer when they congregate on the north side of the Aleutian passes. Their destruction would not only save large numbers of fur seals, but would undoubtedly protect the few sea otters still remaining in those waters.

WHITE WHALE, OR BELUGA
(Delphinapterus leucas)

The white whale, or beluga of the Russians, is a circumpolar species, limited to the extreme northern coasts of the Old and the New Worlds. The adult is entirely of a milk-white color, is very conspicuous, and as it comes up to "blow" presents an interesting sight. The young beluga is dark slate color, becoming gradually paler for several years until it attains its growth. The beluga usually lives in the shallow waters along shore, and not only frequents sheltered bays and tidal streams, but ascends rivers for considerable distances. Plentiful along the coast of Alaska, especially in Bering Sea and the Arctic Ocean, this whale also ascends the Yukon for a long distance. It also comes down the Atlantic coast and enters the lower St. Lawrence River.

The white whale is said at times to attain a length of 20 feet, but its ordinary length is nearer 10 or 12 feet. It travels in irregular "schools" of from three to ten or fifteen individuals and usually rolls high out of water when it comes up to breathe. It enters sheltered bays and the lower courses of streams, mainly at night, in pursuit of fish, which furnish its main food supply. During the twilight hours of the Arctic summer night, glowing with beautiful colors, the ghostly white forms of these whales breaking the smooth blue-black surface of a far northern bay add the crowning effect of strange unworldly mystery to the scene.

When on hunting trips in early autumn, I camped many times on the banks of narrow tide channels leading through the coastal tundra, and for hours during the darkness of night, as the tide was rising, heard the deep-sighing sound of their blowing, as schools of belugas fished up and down the current, often only 15 or 20 feet from where I lay.

The oil and flesh of the white whale is highly prized by the Eskimos, and they not only pursue it in kyaks with harpoon and float, but set large-meshed nets of strong seal-skin cords off projecting points near entrances to bays. Young or medium-sized animals are often caught in this manner, but powerful adults often tear the nets to fragments.

The beluga frequents broken pack ice along shore, and one trapped alive by the closing ice north of the Yukon early one winter was reported by the Eskimos to have uttered curious squeaking noises when they attacked and killed it—an interesting fact, as the beluga is said to be the only member of the whale family to make vocal sounds of any kind.

When a school has its curiosity aroused by the approach of a boat or for any other cause, the members often raise their heads well out of water, one after the other, and take a deliberate look, then dive and swim to a safe distance before coming up again.

The small size of the beluga has long saved it from organized pursuit. Recently it has been announced that its skin has become valuable for commercial purposes, and that many are being killed. If this continues, these harmless and interesting animals are likely soon to disappear from most of their present haunts, unless proper measures can be taken to protect them from undue killing.

GREENLAND RIGHT WHALE, OR BOWHEAD (Balæna mysticetus)

The Greenland right whale is one of the largest of sea mammals, reaching a length of from 50 to 60 feet, and has a marvelously specialized development. Its enormous head comprises about one-third of the total length, with a gigantic mouth provided with about 400 long, narrow plates of baleen, or whalebone, attached at one end and hanging in overlapping series from the roof of the mouth. These thin plates of baleen rarely exceed a foot in width and are from 2 to over 10 feet long. One edge and the free end of each plate is bordered with a stiff hairlike fringe.

The northern seas frequented by these whales swarm with small, almost microscopic, crustaceans and other minute pelagic life, which is commonly so abundant that great areas of the ocean are tinged by them to a deep brown. These gatherings of small animal life are called "brit" by the whalers and furnish the food supply of the bowhead. The whale swims slowly through the sea with its mouth open, straining the water through the fringed whalebone plates on each side of its mouth, thus retaining on its enormous fleshy tongue a mass of "brit," which is swallowed through a gullet extraordinarily small in comparison with the size of the mouth. Among all the animal life on the earth there is not a more perfectly developed apparatus provided for feeding on highly specialized food than that possessed by the right whale—one of the hugest of beasts and feeding on some of the smallest of animals, untold numbers of which are required for a single mouthful.

The bowhead is a circumpolar species, which in summer frequents the Arctic ice pack and its borders, and on the approach of winter migrates to a more southerly latitude. For centuries this huge mammal has formed the main basis for the whaling industry in far northern waters, first in the Greenland seas and later through Bering Straits into the Arctic basin north of the shores of Siberia and Alaska.

Each large whale is a prize worth winning, since it may yield as much as 200 barrels of oil and several thousand pounds of whalebone. All know of the rise and fall of the whaling business, on which many fortunes were built and on which depended the prosperity of several New England towns.

Whaling served to train a hardy and courageous generation of sailors the like of which can nowhere be found today. They braved the perils of icy seas in scurvy-ridden ships, and when fortune favored brought to port full cargoes of "bone" and oil, which well repaid the hardships endured in their capture. Many a ship and crew sailed into the North in pursuit of these habitants of the icy sea never to return.

Interest in the brave and romantic life of the whalers still exists, though the most picturesque quality of their calling passed with the advent of steam whalers and the "bomb gun," which shoots an explosive charge into the whale and kills it without the exciting struggle which once attended such a capture by open boats.

It has been well said that no people ever advanced in the scale of civilization without the use of some artificial illuminant at night. The world owes a great debt to the right whale and its relatives for their contribution to the "midnight oil," which encouraged learning through the centuries preceding the discovery of mineral oil. It also furnished the whalebone which built up the "stays" so dear to the hearts of our great-grandmothers.

The female right whale has a single young, which she suckles and keeps with her for about a year. She shows much maternal affection, and a number of cases are recorded in which the mother persisted in trying to release her young after it had been harpooned and killed.

Every year, as the pack ice breaks up for the season, the bowheads move north through Bering Straits. As late as 1881 Eskimos along the Arctic coast of Alaska put to sea in walrus-hide umiaks, armed with primitive bone-pointed spears, seal-skin floats, and flint-pointed lances for the capture of these huge beasts. These fearless sea hunters, with their equipment handed down from the Stone Age, were sufficiently successful in their chase to cause trading schooners to make a practice of visiting the villages along the coast to buy their whalebone.

From one of the whaling ships encountered north of Bering Straits the summer of 1881 we secured a harpoon, taken from a bowhead in those waters, bearing a private mark which proved that it came from a whaling ship on the Greenland coast, thus showing conclusively that these whales in their wanderings make the "Northwest Passage."

Persistent hunting through the centuries has vastly decreased whales of all valued species, and the modern steam whaler is hastening their end. Their only hope of survival lies in wise international action, and it is urgent that this be secured in time.

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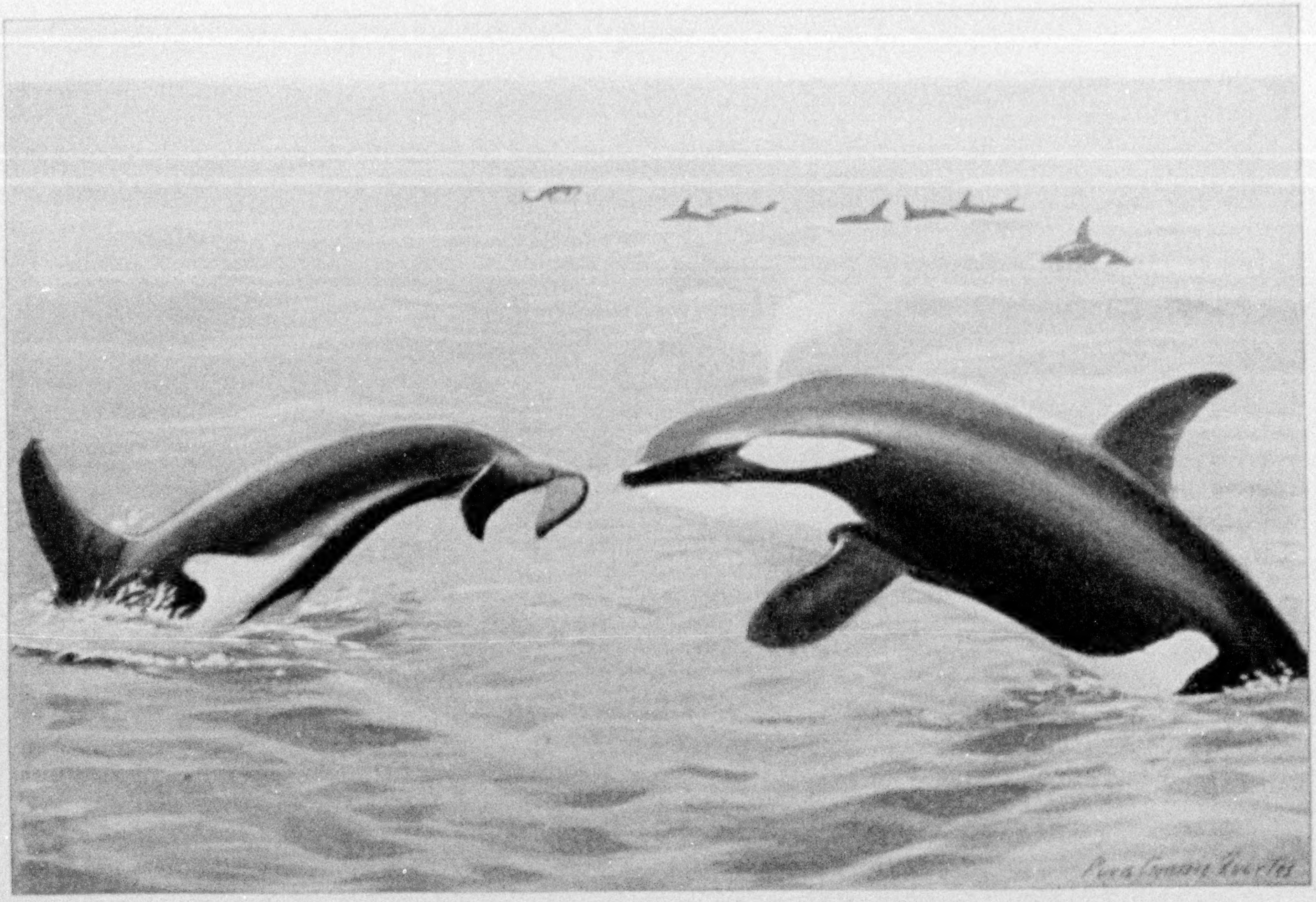
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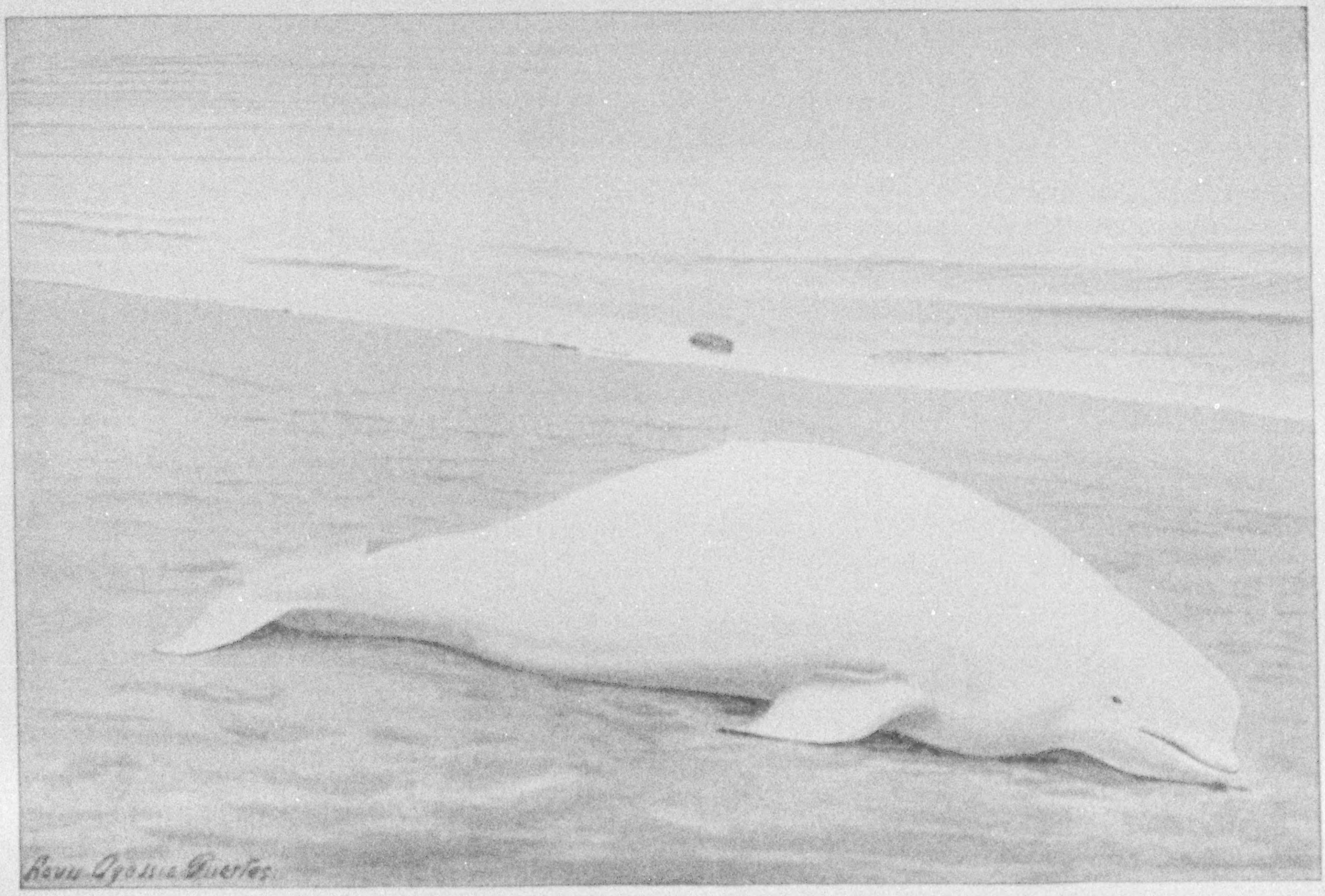
KILLER WHALE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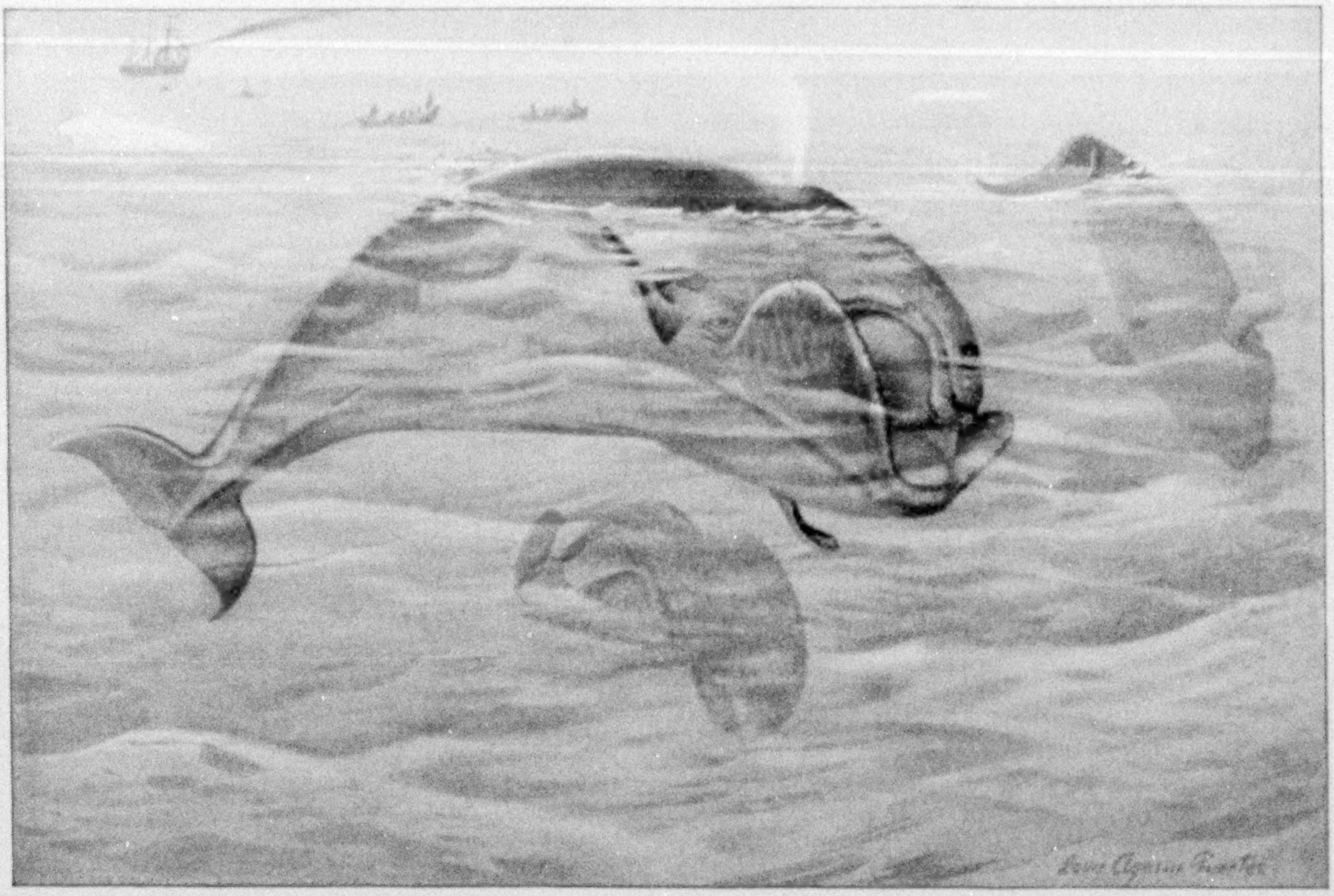
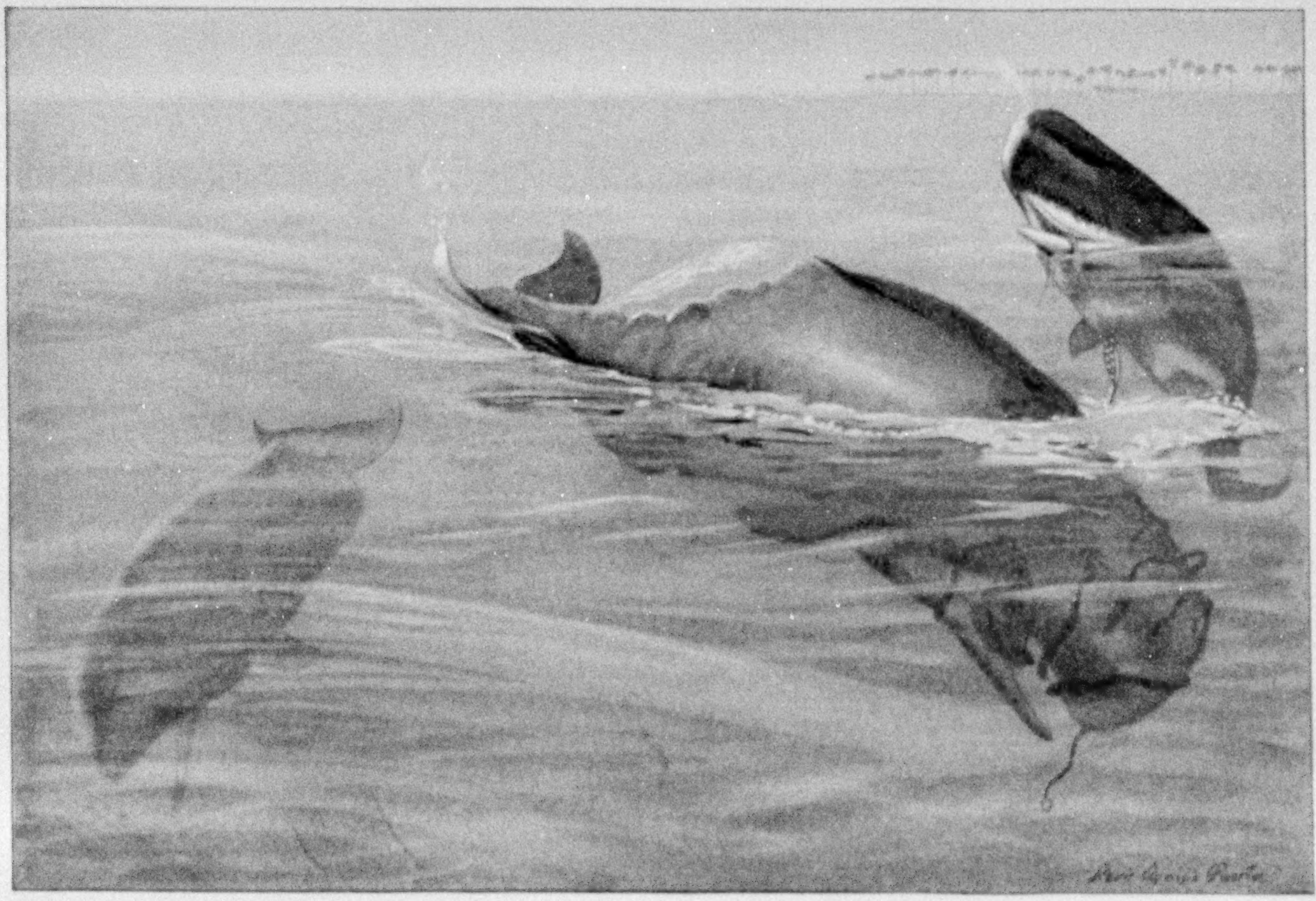
WHITE WHALE, OR BELUGA



GREENLAND RIGHT WHALE, OR BOWHEAD



SPERM WHALE, OR CACHALOT

SPERM WHALE, OR CACHALOT
(Physeter macrocephalus)

The cachalot is from 40 to 60 feet long, about equaling the Greenland bowhead whale in size. It has a huge blunt head, which comprises about one-third of the entire animal. The mouth is large and the under jaw is provided with a row of heavy teeth, consisting of ivory finer in grain than that from an elephant's tusk.

The great whaling industry of the last two centuries was based mainly on the sperm and the bowhead whales. The largest of the bowheads is limited to the cold northern waters, but the sperm whale frequents the tropic and subtropic seas around the globe. The main hunting area for them lies in the South Pacific, but they frequently visit more temperate coasts, especially when seeking sheltered bays, where their young may be born. The young are suckled and guarded carefully until old enough to be left to their own devices. Sperm whales sometimes occur off both coasts of the United States, especially off southern California.

The feeding grounds of these whales are mainly in the deepest parts of the ocean, where they cruise about in irregular schools containing a number of individuals. Their food consists almost entirely of large octopuses and giant squids, which are swallowed in large sections.

As befits a gigantic mammal possessing huge jaws armed with rows of fighting teeth, the sperm whale is a much more pugnacious animal than the bowhead. There are many records of whale-boats being smashed by them, and several well-authenticated cases of enraged bull cachalots having charged and crushed in the sides of whaling ships, causing them speedily to founder.

The sperm whale yields oil of a better quality than the bowhead. Its huge head always contains a considerable number of barrels of specially fine-grade oil, which produces the spermaceti of commerce. Ambergris, having an excessively high value for use in the manufacture of certain perfumes, is a product occasionally formed in the digestive tract of the sperm whale.

The name cachalot is one to conjure with. It brings up visions of three-year voyages to the famed South Seas, palm-bedecked coral islands, and idyllic days with dusky islanders. As in the case of the Greenland bowhead, however, this animal has been hunted until only a small fraction of its former numbers survives and the romantic days of its pursuit are gone, never to return.

THE LARGER NORTH AMERICAN MAMMALS

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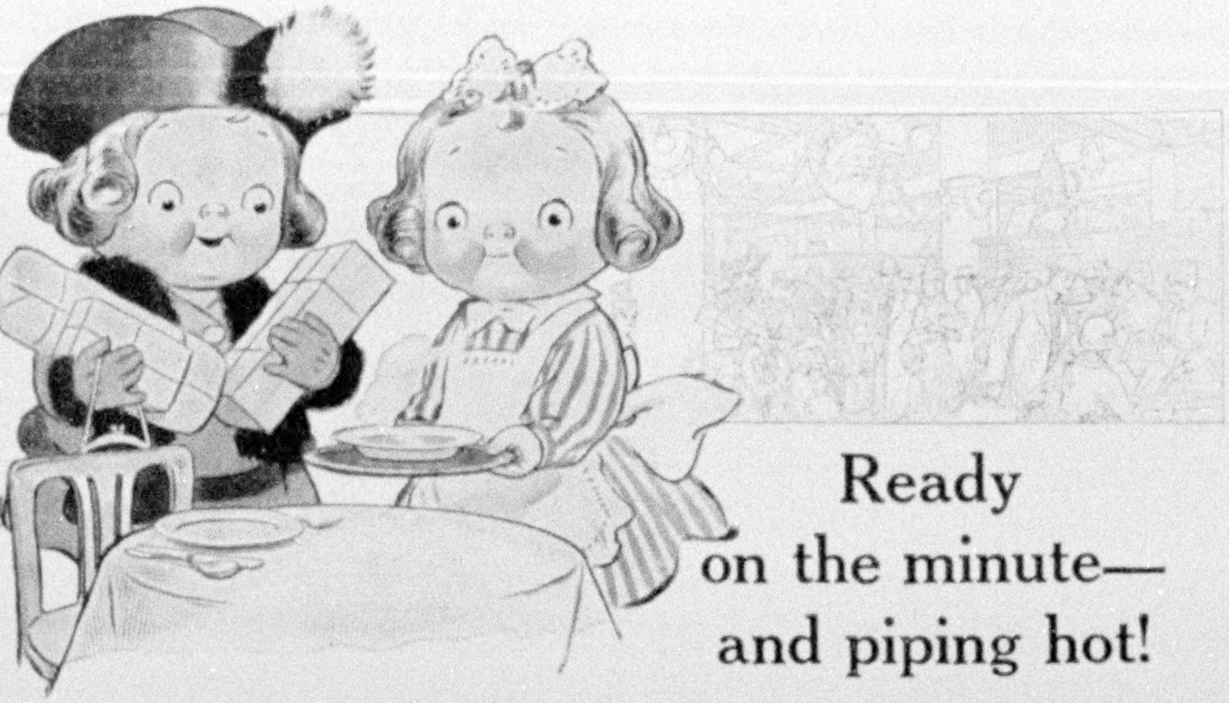

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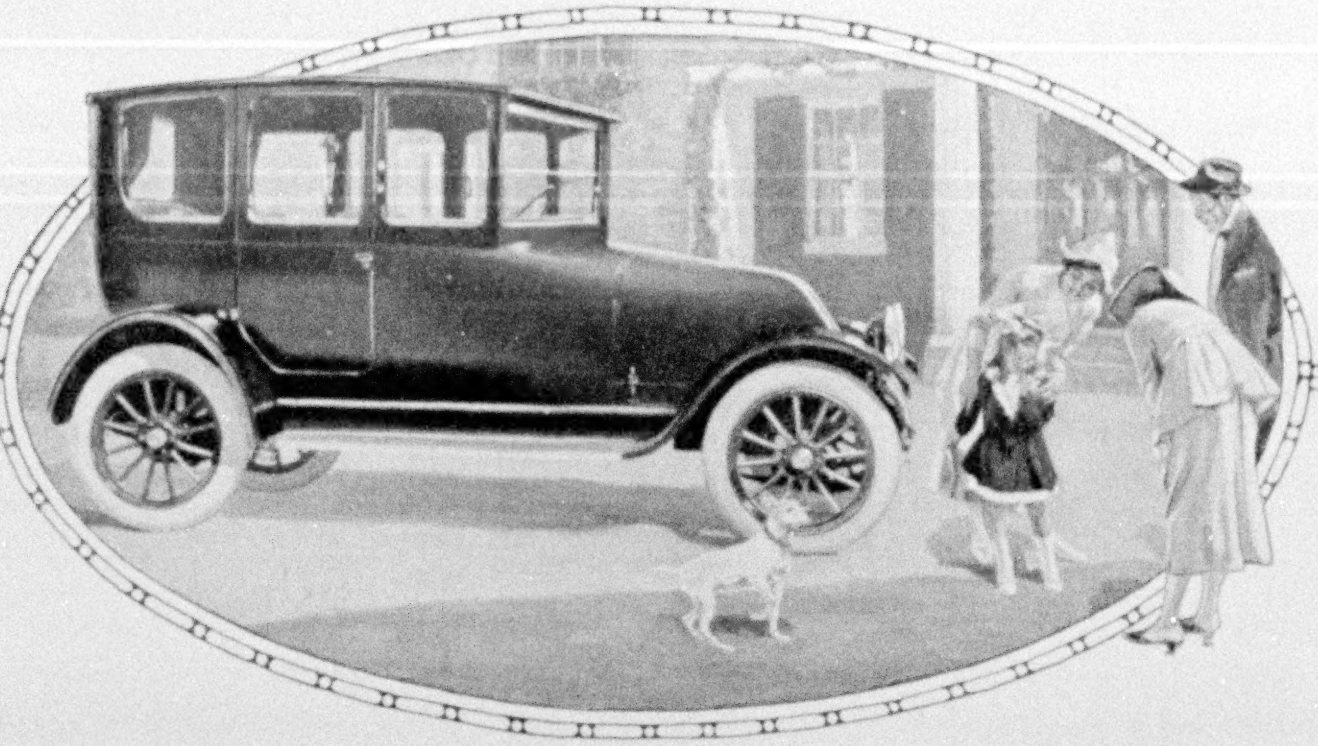

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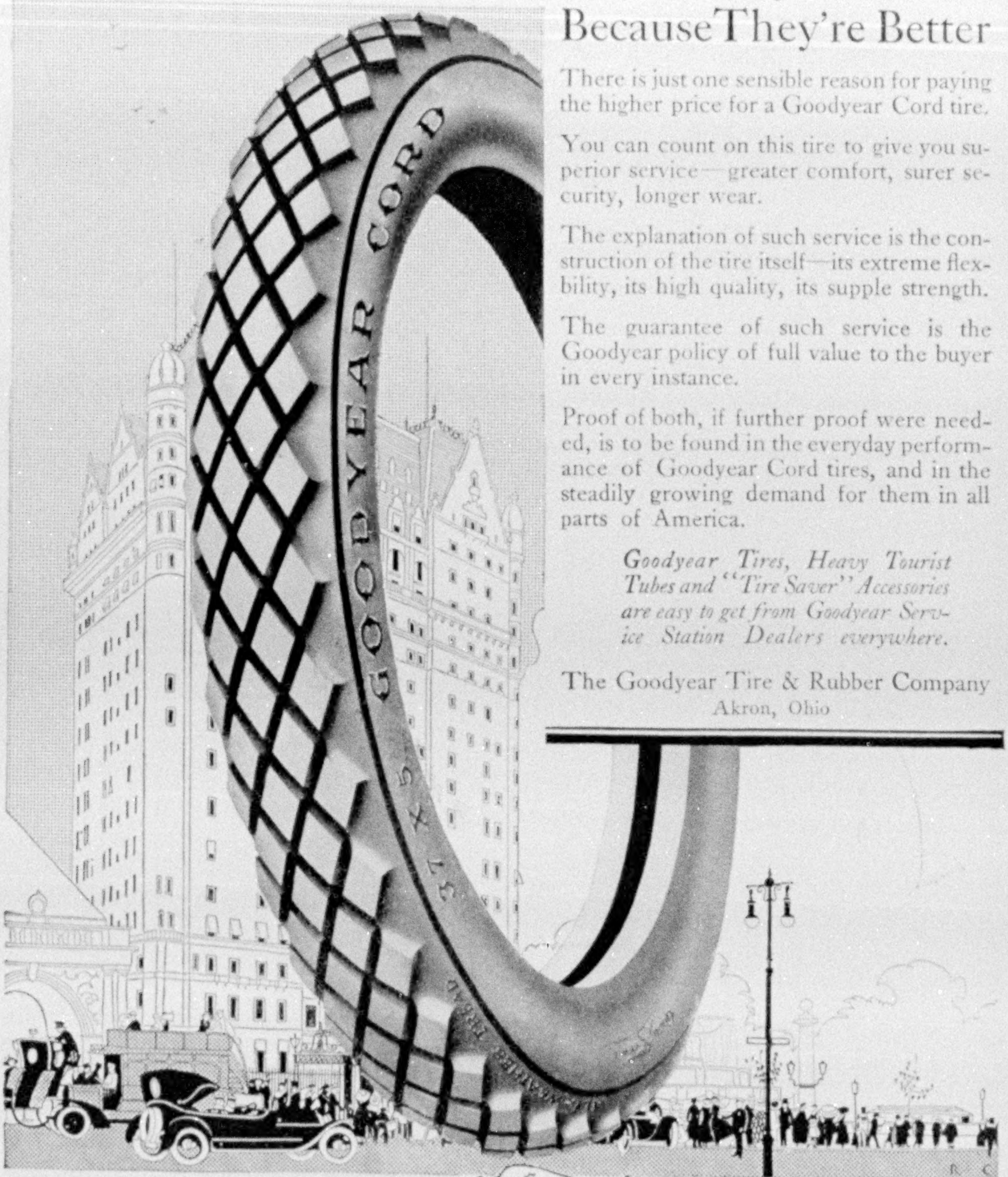

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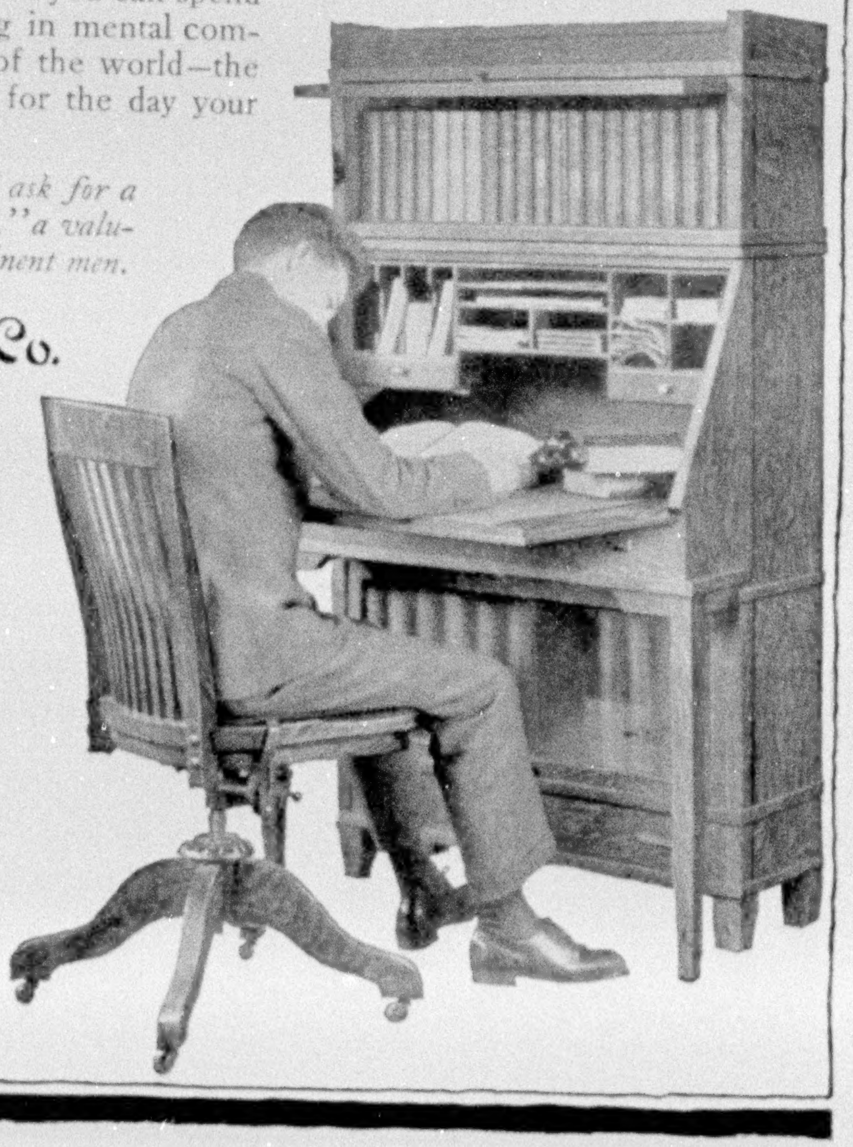

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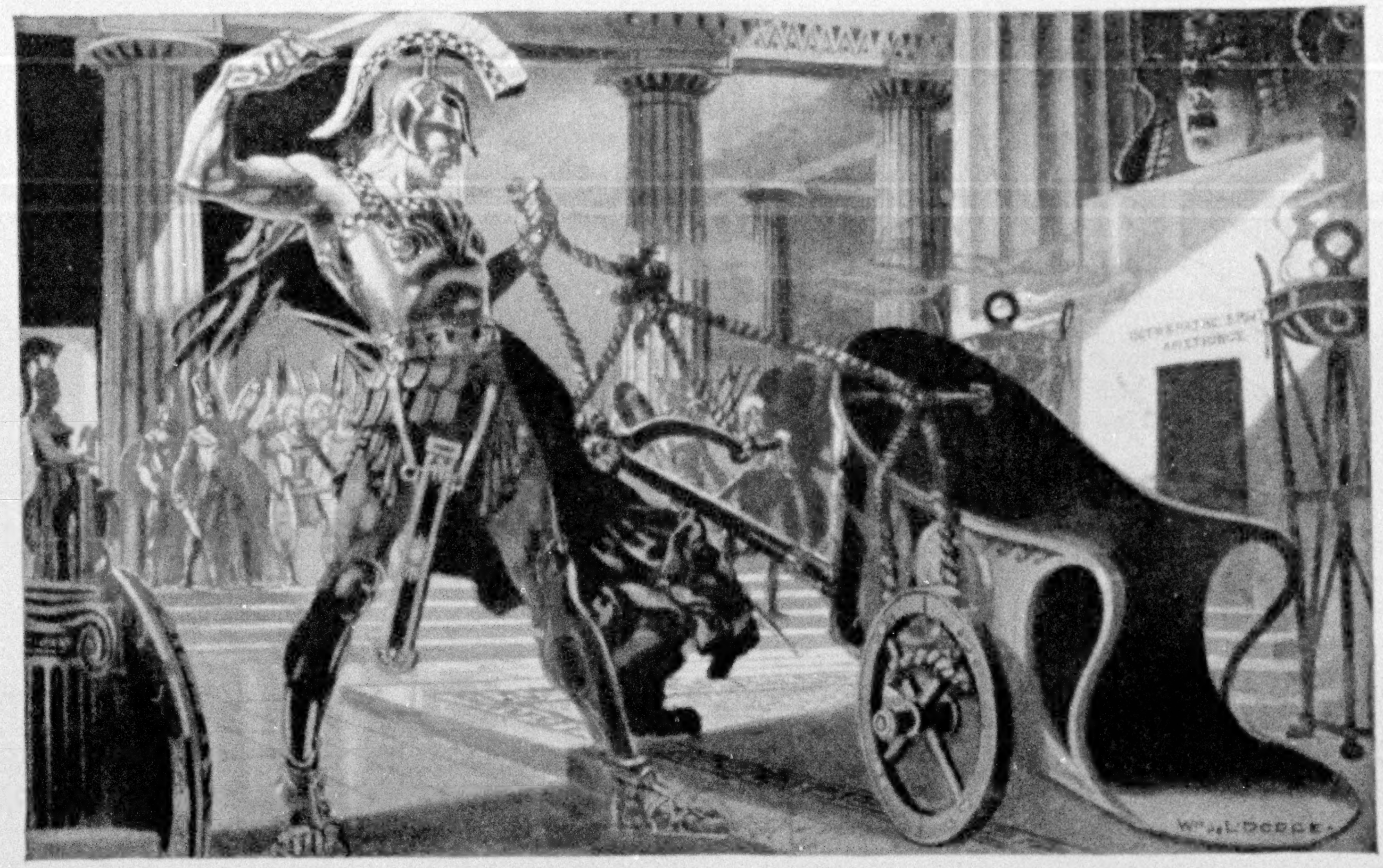

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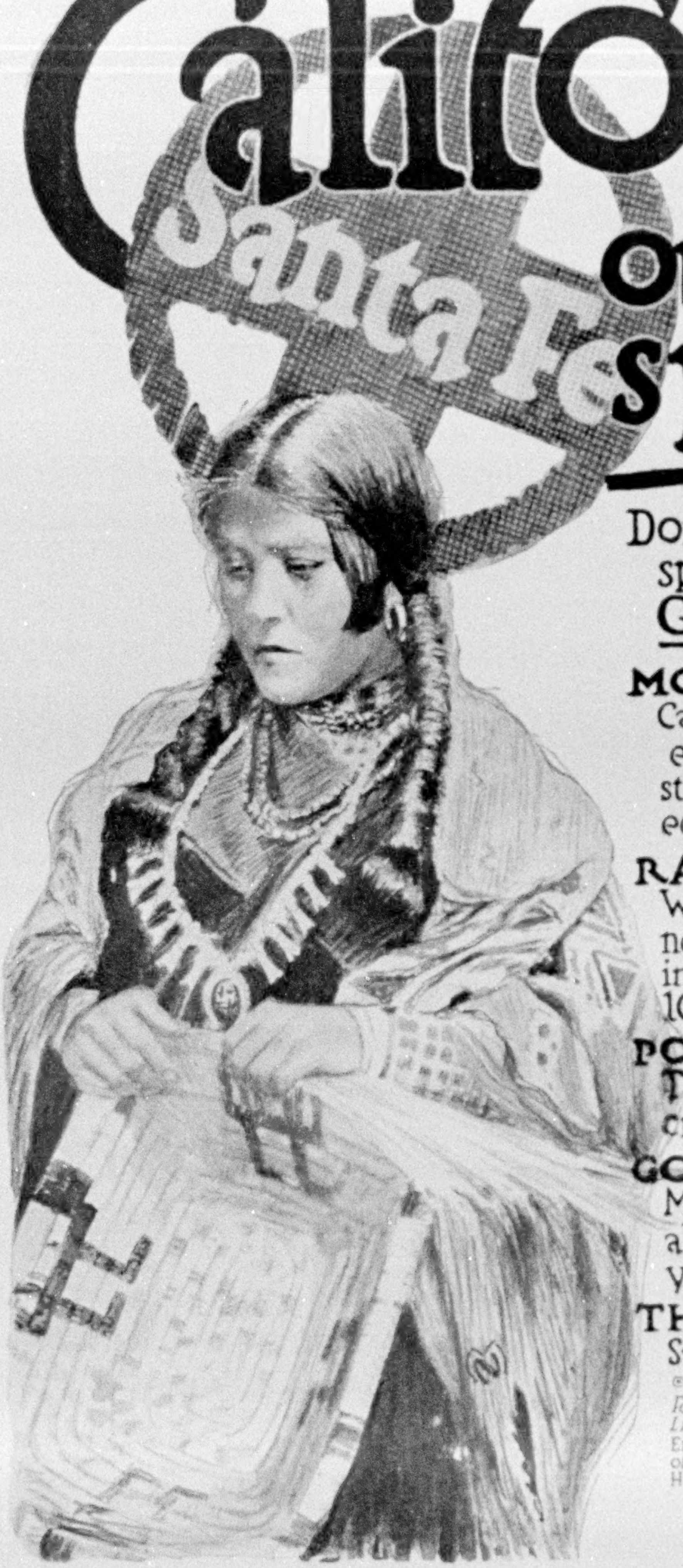

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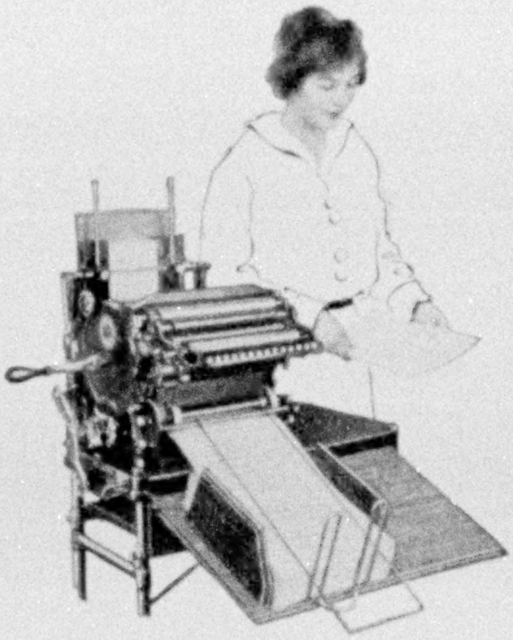

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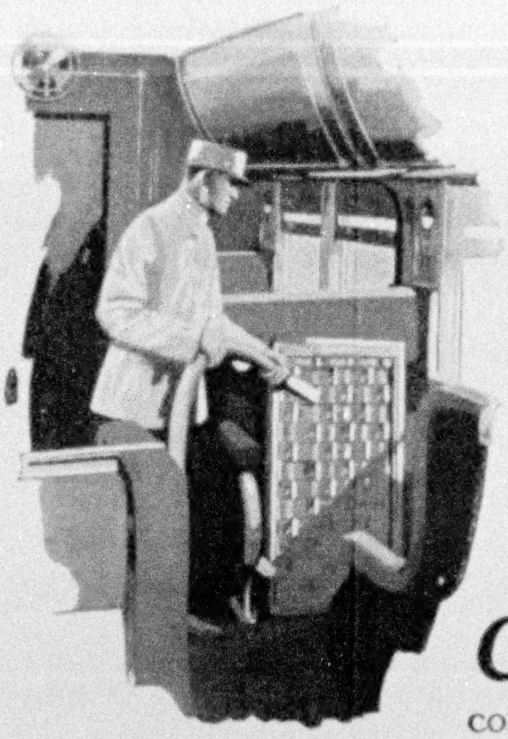
Street Address ....

Town .... State ....



An Advertisement by
THE PULLMAN COMPANY

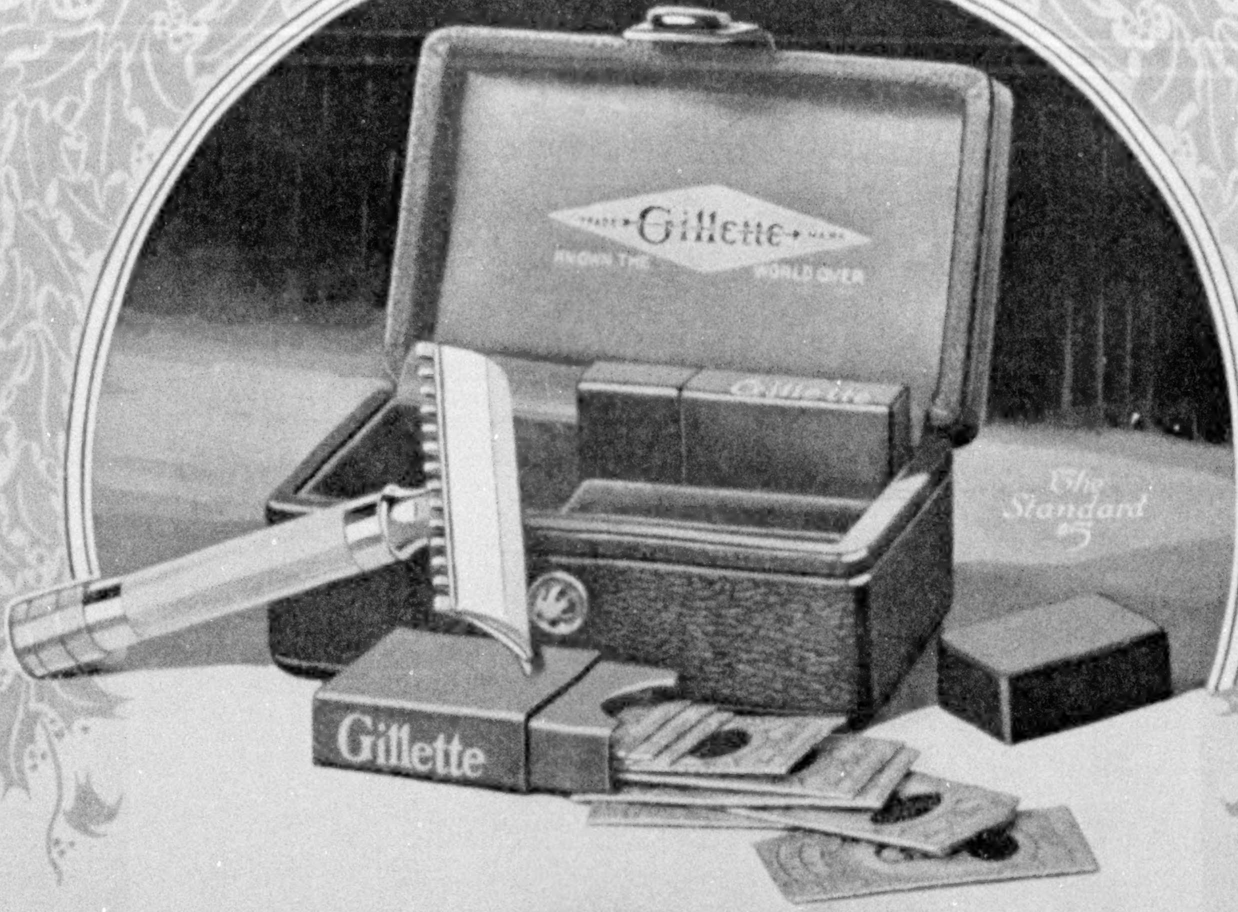
Cleanliness. To maintain in a condition of absolute cleanliness the large number of cars, constantly in operation in every part of the country under conditions of dust and dirt unavoidable in railroad operation and annually accommodating approximately twenty-five million passengers, requires an elaborate organization trained by years of experience and maintained at a large annual expenditure.

The modern Pullman car contains everything essential to cleanliness and sanitation which the best experts upon these subjects have been able to devise.

After every trip each car is thoroughly cleaned and at frequent intervals fumigated in accordance with state and federal standards.

To accomplish this three hundred and eighty-three cleaning stations, with over four thousand yard employes, are maintained in various cities.

By such thorough and consistent effort every Pullman passenger receives the greatest possible protection from the discomfort of dust and dirt usually associated with railway travel.


TRADE Gillette MARK
KNOWN THE WORLD OVER
Gillette
Gillette
The Standard $5

Are You a Friend of His?

Give Him a Gillette

WHAT could you give that he will use so often—and like so much? The happiest hit of all the gifts at Christmas. See the displays—buy now!

The Bulldog, the Aristocrat, the Standard Set or Pocket Edition—$5; with gold-plated razor, $6. Or more elaborate—a Combination or Traveler's Set, $6 to $50.

A clever "little gift" is a packet of Gillette Blades—50c. or $1. Dealers everywhere. Write us for Catalogue.

GILLETTE SAFETY RAZOR COMPANY
BOSTON, MASSACHUSETTS

NO STROPPING NO HONING

TRADE Gillette MARK

The Baldwin Piano

THE truly great in letters, art, or music are never provincial. They have a message for the world, and the world listens. The Baldwin Piano speaks in a tone that appeals to all humanity. It is the American instrument that has become a world favorite. The admiration for it abroad as at home attests its leadership.

Send for The Book of the Baldwin.

The Baldwin Piano Company

CINCINNATI
142 W. Fourth Street

CHICAGO
323 S. Wabash Avenue

ST. LOUIS
1111 Olive Street

NEW YORK
665 Fifth Avenue

DENVER
1636 California Street

SAN FRANCISCO
310 Sutter Street

INDIANAPOLIS
18 N. Penn'a St.

LOUISVILLE
425 S. Fourth Ave.

DALLAS
1911 Elm St.

THE WORKS OF SHAKESPEARE

Hess-Ives Hicro Camera

THE Hicro Camera made it possible for you to capture and retain on paper the glorious colors of nature, as many prints as you like — the most important advance in photography since the days of Daguerre.

The Hiblock

a sensitized three-color plate, which now makes it possible for any photographer of ordinary skill to take color photographs with *his own* camera, is another important advance. The Hiblock comes in three sizes, 5 x 7, 8 x 10, 11 x 14. Slips in *your* camera like any holder. Opens up an immense field in portrait work for professionals. Send for booklet telling how the Hiblock operates.

HESS-IVES CORPORATION
1201 Race Street Philadelphia

JONES DAIRY FARM SAUSAGE

Thirtieth Season

IT is *economical*—there is little or no waste. It is *good food value.* It is *appetizing* to the most fastidious.

This is our 30th season in the manufacture of Jones Dairy Farm Products. Your grocer will tell you of our prices and times of shipment.

Be sure that it's Jones.

MILO C. JONES
Jones Dairy Farm
Ft. Atkinson, Wis.

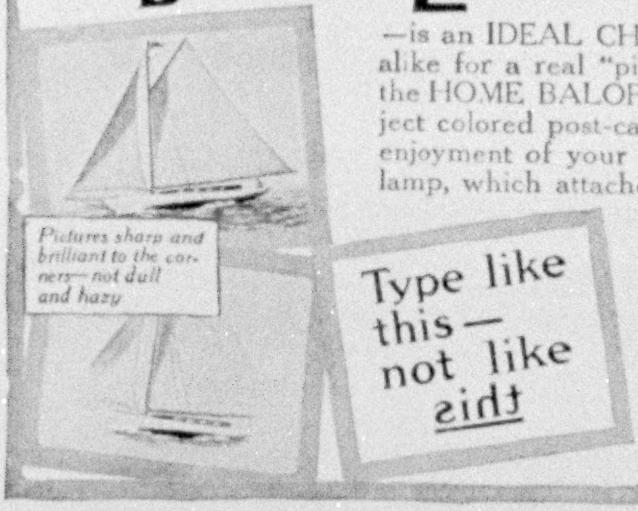
The Perfect Stereopticon

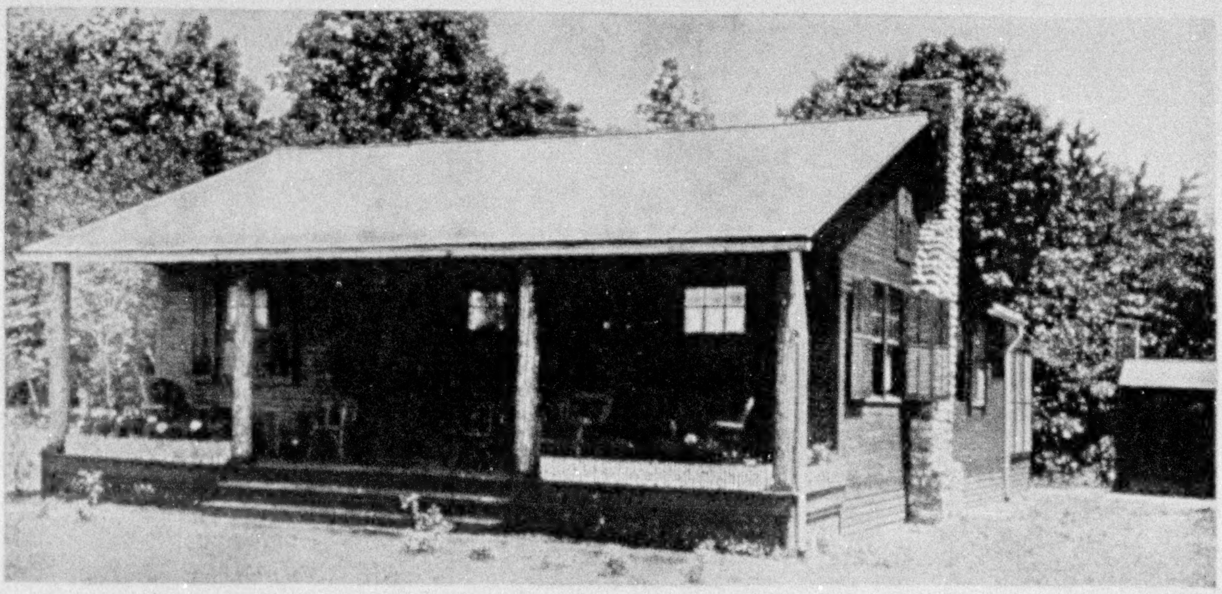
THE
Bausch and Lomb BALOPTICON

—is an IDEAL CHRISTMAS GIFT. It fulfills the desire of young and old alike for a real "picture machine," not a toy. There are many models, but the HOME BALOPTICON particularly appeals to all. With it you can project colored post-cards, photo prints, solid objects, etc., on a screen for the enjoyment of your family and friends. Fitted with new gas-filled Mazda lamp, which attaches to any socket and runs itself. Extremely simple to operate. Price, including aluminum-coated screen, $35.00. Other models for lantern slides, $20.00 and up.

Write for booklets about the Balopticon—also price lists.

Bausch & Lomb Optical Co.
507 St. Paul Street, Rochester, N. Y.
New York Washington Chicago San Francisco
Leading American Makers of High-Grade Optical Products.


Pictures sharp and brilliant to the corners—not dull and hazy
Type like this— not like ƨiʜƚ



Anywhere You Wish

BY the side of your favorite trout stream—at the shores of a mountain lake, you can have this sturdy, comfortable building put up easily and quickly by unskilled labor.

Built by the **BOSSERT** unit system—with air chamber sections—fully finished at the factory. Contains 12x15 living room, dining room, kitchen, three bed-rooms, and bath.

Send 12 cents today for catalog showing many attractive designs and details of Bossert permanent construction.

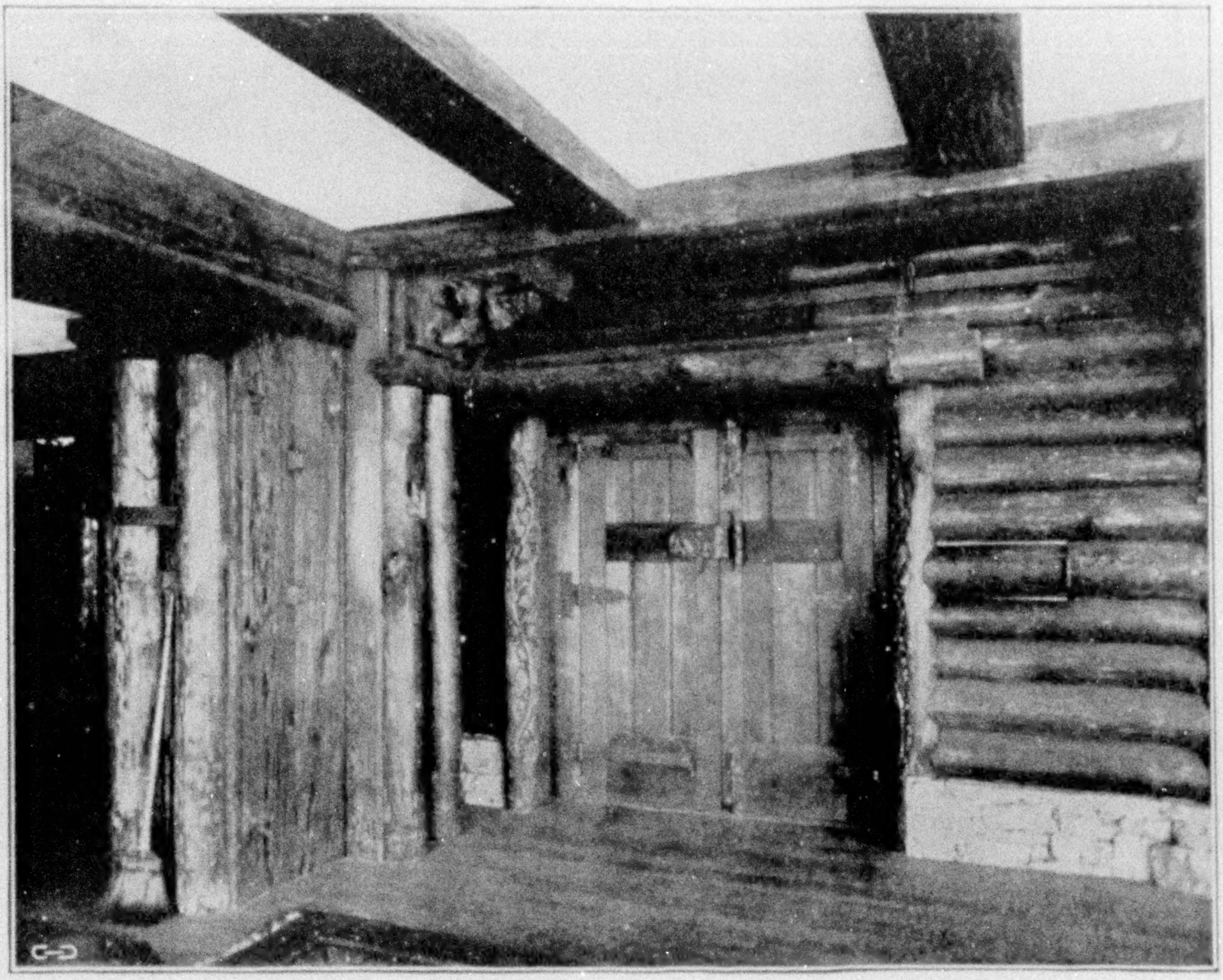
LOUIS BOSSERT & SONS, Inc., 1319 Grand Street, Brooklyn, N. Y.
BUILDERS OF BUNGALOWS FOR 25 YEARS

EXAMPLE No. 2

"*Pecky*" *Cypress Used as Interior Trim!*

on one of the most artistic of America's great estates.

NO. 2 in SERIES SHOWING "PECKY" CYPRESS IN MR. HENRY FORD'S NEW RESIDENCE.



A CORNER IN THE "FIELD" ROOM: ESTATE OF HENRY FORD, ESQ., DEARBORN, MICHIGAN.
MR. W. H. VAN TINE, ARCHITECT, DETROIT.

You naturally ask, "What IS 'Pecky' Cypress?" Well, it's the innermost heart of the older trees, many of them as old as the Crusades and probably all of them antedating Columbus. "Pecky" Cypress is the part of the Cypress tree which has been attacked by the rot-germs and has repelled and destroyed them. Vol. 2 of the famous Cypress Pocket Library contains photographs by eminent scientists showing exactly how the destructive decay agencies literally "died on the job" instead of multiplying, as they do in most woods. It's an absorbing and wonderful demonstration of the "eternal" quality of Cypress. And the "Pecky" part itself is (for certain uses) the greatest "buy" in the whole world of lumber. After reading Vol. 2 you'll want some "Pecky" Cypress around the place for its art value as well as its economy and novelty.

JUST WRITE FOR VOL. 2—IT'S A FASCINATOR AS WELL AS A MONEY-SAVER.

(*"Pecky" Cypress is the* LOWEST GRADE *of Cypress, "the Wood Eternal"—but it's fine for what it's good for.*)

Let our "ALL-ROUND HELPS DEPARTMENT" help YOU. Our entire resources are at your service with Reliable Counsel.

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1224 Hibernia Bank Building, New Orleans, La., or 1224 Heard National Bank Bldg., Jacksonville, Fla.

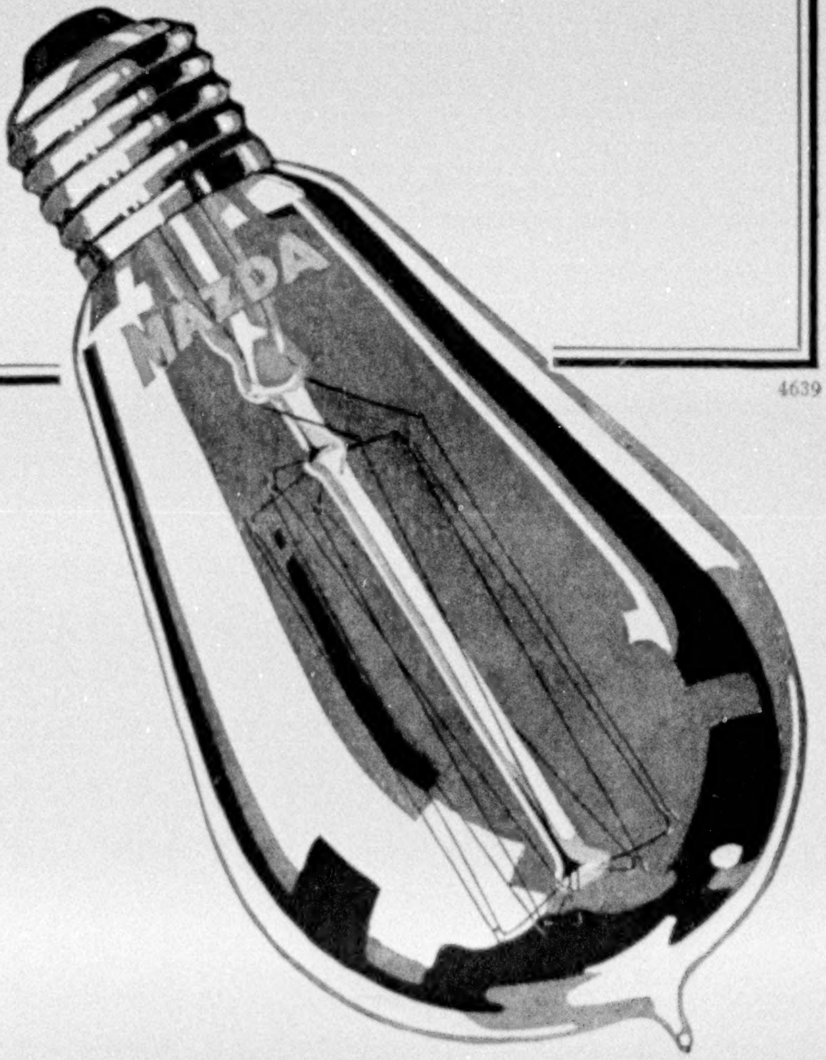
INSIST ON CYPRESS AT YOUR LOCAL LUMBER DEALER'S. IF HE HASN'T IT, *LET US KNOW IMMEDIATELY.*

MAZDA

"Not the name of a thing, but the mark of a service"

As the turbines draw from Niagara the energy that sets the motors whirling—so MAZDA Service draws from the flood of new thoughts in lighting, the ideas that help the lamp-makers make better lamps.

4639



—— The Meaning of MAZDA ——

MAZDA is the trademark of a world-wide service to certain lamp manufacturers. Its purpose is to collect and select scientific and practical information concerning progress and developments in the art of incandescent lamp manufacturing and to distribute this information to the companies entitled to receive this Service. MAZDA Service is centered in the Research Laboratories of the General Electric Company at Schenectady, New York. The mark MAZDA can appear only on lamps which meet the standards of MAZDA Service. It is thus an assurance of quality. This trademark is the property of the General Electric Company.

RESEARCH LABORATORIES OF
THE GENERAL ELECTRIC COMPANY

Bankers Trust Company's Building

Would you name a friend as trustee?

Often it is desired to keep an estate under the supervision of a friend or member of the family, and yet not burden him with its management.

If you appoint a friend or relative as co-executor and co-trustee with the Bankers Trust Company, your estate will have the desired personal attention and he will be relieved of most of the burden of work and responsibility. Caring for estates and trusts is the primary object of the Trust Company, and it has every facility for managing them safely and advantageously.

The officers of this Company will be glad to confer with you, or to send you information regarding any trust or banking business you may have in mind.

BANKERS TRUST COMPANY

16 Wall Street New York

Resources over $250,000,000

W

WESTINGHOUSE ELECTRIC

In the second or two that follows the pressing of your foot on the button, the starting motor on your motor car must turn the engine flywheel at the rate of 150 to 175 revolutions a minute, a task imposing great strain, especially on cold days.

Westinghouse Motors stand this strain. They start quickly, whatever the weather. Furthermore, they are insulated by a Westinghouse process that protects the wiring against water, oil, and gasoline, preventing short-circuiting and burn-outs.

Half a hundred automobile builders pay the higher price for Westinghouse Equipment, because they know it's worth more.

Making Light of Heavy Work

Westinghouse

STARTING, LIGHTING & IGNITION EQUIPMENT

STEINWAY

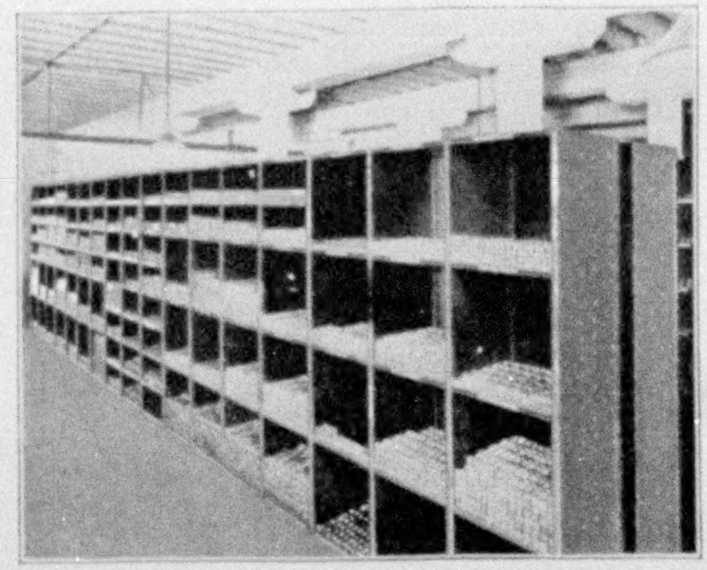
TO own a Steinway is to have a limitless source of satisfying pleasure to be shared with your friends. It is a possession to be proud of, both as a flawless musical instrument and as a piece of furniture of unexcelled beauty.

The Steinway has set the world's standard wherever pianos are known, with a degree of perfection which has never been successfully imitated.

The price of the Steinway is but little more than the cost of ordinary pianos. Send for illustrated literature and terms.

STEINWAY & SONS, STEINWAY HALL
107-109 East 14th Street, New York
Subway Express Station at the door

DURAND Steel Racks



THIS picture demonstrates the rigid strength of Durand Steel Racks. This one is supporting *three barrels* of steel bolts on *one* shelf (1600 pounds).

Test out Durand Steel Racks in *your* factory. They'll carry your loads in much smaller space and give you greater safety and convenience.

Adjustable on three-inch units. Write for our new catalogue, showing construction.

We will gladly prepare plans, specifications, and estimates on Steel Locker or Steel Rack Equipment.

DURAND STEEL LOCKER CO.

1507 Ft. Dearborn Bk. Bldg.
Chicago

907 Vanderbilt Bldg.
New York

"CADO"
LINE-DATER
Patent
Applied for

—it's safest to date all papers

"Cado"

(All Metal)

$1.00 Dater

This great time-saver should be on every busy man's desk. No guessing, no errors; imprints the date clearly—thus :

APR 20 '14

Re-inks automatically before each impression. Richly nickeled; nothing to get out of order. Will last years.

Ask your dealer, or send for one at our risk. Money back guarantee.

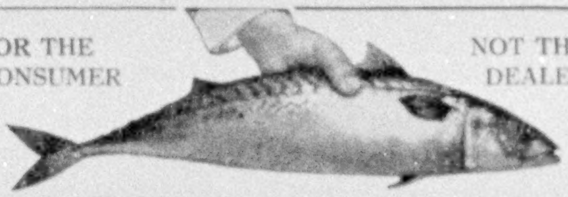
CUSHMAN & DENISON Mfg. Co.
246 West 23d Street
NEW YORK

Salt Mackerel

CODFISH, FRESH LOBSTER

FOR THE CONSUMER

NOT THE DEALER



FOR YOUR OWN TABLE

FAMILIES who are fond of **FISH** ought to get them **DIRECT** from **GLOUCESTER**, as no inland dealer anywhere else can possibly be in a position to offer you goods as perfect and wholesome as we can.

We sell **ONLY** to the **CONSUMER DIRECT**, not through grocers or markets. We want to supply **YOU**, no matter how small your requirements.

We have done a mail-order fish business for thirty years, sending the goods **RIGHT TO OUR CUSTOMERS' HOMES, EXPRESS PREPAID EAST OF KANSAS**, and guaranteeing complete satisfaction or money refunded.

If you are interested in good fish, won't you drop us a postal that we may send you further information?

Our **SALT MACKEREL** are tender, juicy fellows—broiled for breakfast they are delicious. **SALT CODFISH** selected and prepared by our method is unexcelled.

Much of the fresh fish you buy in the market is at least several days old. **OUR CANNED FISH**, being **STEAM STERILIZED**, is **ABSOLUTELY FRESH**.

Our **FRESH LOBSTERS**, in parchment-lined cans, go through no process except boiling (no preparation of any kind being used). Opened and packed solid in whole pieces as soon as taken from the water, they retain their crispness and natural flavor. **CRABMEAT, SHRIMP** and **CLAMS** have likewise a perfectly natural appearance and taste.

Our **SALMON, TUNNY** and **IMPORTED FISH DELICACIES** are always the best produced.

A selection of our **FISH PRODUCTS** should always be in your **STORE-ROOM** for daily use and for the preparation at a moment's notice of dozens of dainty or substantial dishes.

Send for Descriptive Price List
Frank E. Davis Co., 126 Central Wf., Gloucester, Mass.

So the Children Didn't Lose Their Christmas After All!

WHEN Daddy was taken down with pneumonia, just a month before Christmas, mother thought things looked pretty black. In her mind she saw the Christmas cheer vanish. Only an empty stocking for the babies this year, and all the joy of Christmas Eve and Christmas morning turned to sorrow. It was bad enough to have him ill, and this seemed the last straw.

But she didn't know that he had ÆTNA-IZED. He knew that accident and sickness wait on no man. He had not considered himself stronger than Destiny. **He had protected himself while he could.**

ÆTNA-IZE

Protect yourself now. If you are in a "Preferred" occupation and under 51 years of age and pay $60 a year for an Ætna Disability Policy, you will get:

$25 a week up to 52 weeks while you are ill. $25 a week for 100 weeks—nearly two years—if you lose the sight of both eyes by disease, or the use of both hands or feet or one hand and one foot by paralysis. Also payment of hospital charges up to $12.50 per week for ten weeks, or for a surgical operation.

Or you will get $50 a week as long as you are disabled by a railway, steamship or burning building accident. $25 a week if disabled by an ordinary accident.

If you are killed in an accident, or lose two limbs or both eyes, you will get from $5,000 to $15,000. Half as much for loss of one hand, foot or eye, depending on the character of the accident and how long you have carried the insurance.

For your wife's sake and your children's sake, send this coupon—now.

Send this coupon and let Ætna send you your pay envelope when you need it most.

ÆTNA LIFE INSURANCE COMPANY
Drawer 1341 HARTFORD, CONN.

The largest company in the world writing Life, Accident, Health and Liability Insurance

Agency opportunities for all Casualty and Bonding lines

An Ætna Agent has a national advertising campaign working for *him* all the time

N. G.-11-16

Name ....

Occupation ....

Bus. Address ....

ÆTNA LIFE INSURANCE COMPANY
Drawer 1341 HARTFORD, CONN.

I have marked the kinds of insurance I wish to know about: Accident ☐, Health ☐, Disability ☐, $250 Life Certificate ☐. My age is.... years. I am in good health.

19

WHITE HOUSE

BRAND

COFFEE

And TEAS

WHITE HOUSE
ORANGE PEKOE
TEA
DWINELL-WRIGHT CO.
BOSTON-CHICAGO.
WHITE HOUSE
BRAND
COFFEE
DWINELL-WRIGHT CO.
BOSTON-CHICAGO.

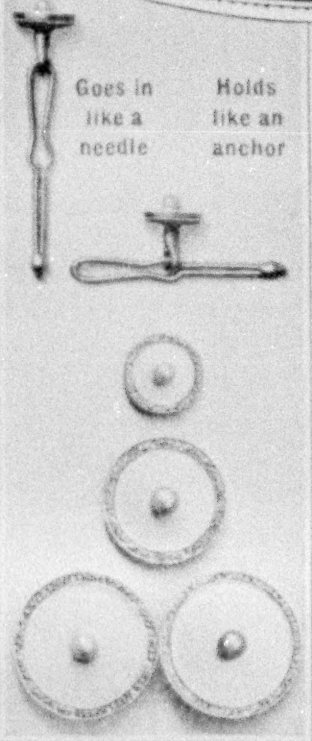
In our campaign for a *"Better Cup of Coffee"* we need the assistance of the intelligent housewife to the end that the *splendid material* furnished by us under the name of "White House" be not spoiled in the brewing.

The WHITE HOUSE COFFEE is sold in the bean, ground or pulverized, and *never* in any package but the *one, two, or three-pound ALL-TIN cans.* White House *TEA,* quarter and half-pound *ALL-TIN cans, all varieties,* just as good as White House Coffee.

DWINELL-WRIGHT CO.

Principal Coffee Roasters BOSTON—CHICAGO

Krementz Evening Jewelry


Goes in like a needle
Holds like an anchor

"Just what I would have selected" is his verdict when you give him Krementz Correct Evening Jewelry.

And if you are seeking evening jewelry that is not only correct, but original in its execution, ask your jeweler to show you his Krementz designs. They range from the strictly conventional to the exquisite combinations of platinum and gold, set with diamonds or other precious stones.

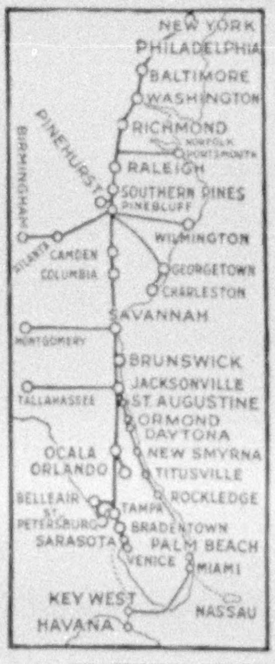
Aside from its obvious quality, Krementz Evening Jewelry is identified by the name "Krementz" on the back of each piece and by the bodkin clutch on the back of the studs and vest buttons—a much appreciated and exclusive feature.

Write for the name of the jeweler nearest you who has a representative assortment in his stock.

Krementz & Company
NEWARK—NEW JERSEY

SEABOARD AIR LINE RAILWAY

The Progressive Railway of the South


NEW YORK
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PINEHURST
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SOUTHERN PINES
PINEBLUFF
WILMINGTON
ATLANTA
CAMDEN
COLUMBIA
GEORGETOWN
CHARLESTON
SAVANNAH
MONTGOMERY
BRUNSWICK
JACKSONVILLE
TALLAHASSEE
ST. AUGUSTINE
ORMOND
DAYTONA
OCALA
ORLANDO
NEW SMYRNA
TITUSVILLE
ROCKLEDGE
BELLEAIR
TAMPA
ST. PETERSBURG
BRADENTOWN
SARASOTA
PALM BEACH
VENICE
MIAMI
KEY WEST
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Shortest

Most Attractive Route to

Florida
Georgia
Cuba

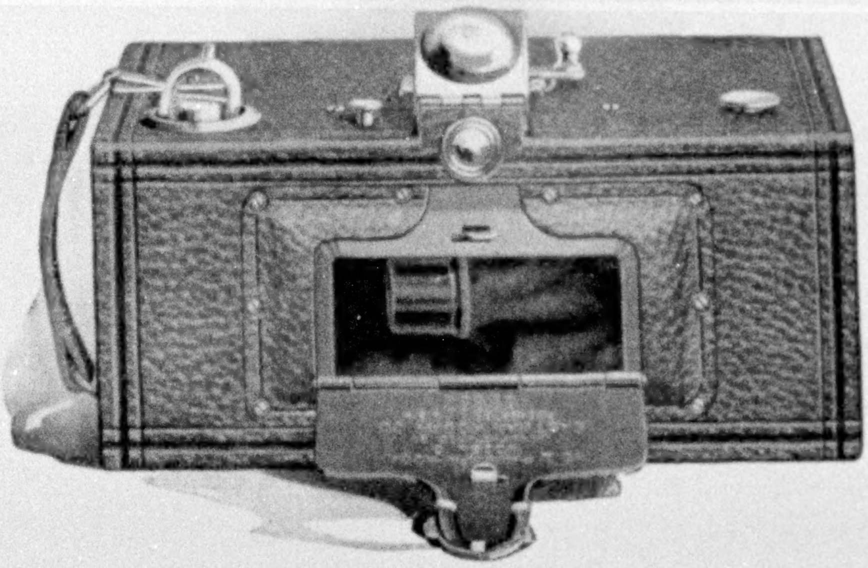
and the

Carolina Resorts

Where to spend the winter is answered in our *Resort, Hotel, Golf, and Sports Guides.* For

Excursion Rates

Write W. E. CONKLYN
General Eastern Passenger Agent
1184 Broadway, New York



PANORAM KODAKS

Broad vistas, open country, mountains, landscapes—scenes that are constantly presenting themselves to the nature lover and traveler—are, photographically, the exclusive property of the Panoram.

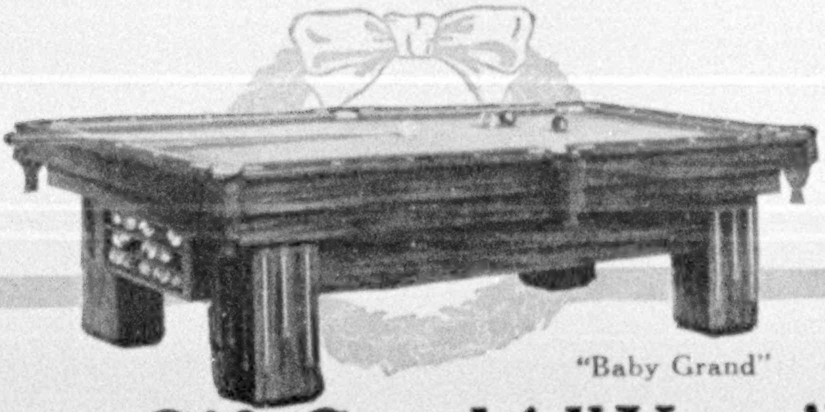
They are extremely simple to operate, are light and are very small in proportion to the size of the picture they make.

THE PRICE.

No. 1 Panoram Kodak, scope of lens, 112 degrees, pictures 2¼ x 7 inches,	$10.00
No. 4 Panoram Kodak, scope of lens, 142 degrees, pictures 3½ x 12 inches,	20.00

EASTMAN KODAK COMPANY,
ROCHESTER, N. Y.

At your dealer's.



"Baby Grand"

The Christmas Gift Good All Year 'Round

Parents, boys and girls and guests are all fascinated by the royal games of Carom and Pocket Billiards when played on Brunswick tables in cozy home surroundings.

After school hours and winter evenings always find the Brunswick the center of merriment and wholesome exercise. Some styles can be set up quickly anywhere and taken down easily after play.

Made of beautiful oak and mahogany, richly inlaid—speed, accuracy and ever-level smoothness—sizes to fit all homes.

Brunswick Home Billiard Tables

$30 and Up—Pay 10c a Day

A small first payment puts any Brunswick that you select in your home for Christmas. After that, pay the balance monthly—*terms as low as 10c a day.*

Balls, Cues, Etc., FREE

With every Brunswick Table we give you a complete Brunswick high-class Playing Outfit—Rack, Markers Balls, Cues, Tips, expert book of 33 games, etc.

Get our 30-day home trial offer and see these tables in our handsome colored catalog—"Billiards—The Home Magnet."

Write or send the attached coupon and have this book by return mail free! Send today and decide in time for Christmas delivery.

The Brunswick-Balke-Collender Co., Dept 42E
623-633 S. Wabash Ave.
Chicago, Ill.

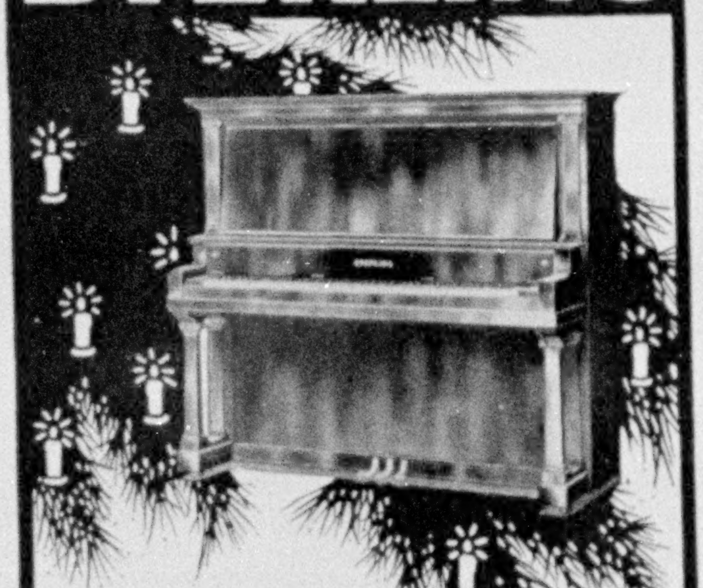
Send FREE, postpaid, color-book,
"Billiards—The Home Magnet"
and tell about your home trial offer.

Name ....

Address ....

....

STERLING



A permanent gift—each day as beautiful as the first day, constantly growing in favor, always adding to the grace of the giver and the charm of the recipient—such is a *Sterling Piano*—the piano with the golden tone—40 years the favorite of the home and the choice of schools of higher aim. Send for the Sterling Book.

THE STERLING CO., DERBY CONN.
Founded 1866 by Chas. A. Sterling

Give Your Boy Every Advantage

Guide and guard his reading with "the biggest, brightest, best magazine for boys in all the world." It helps him to attain true manhood. It is entertaining—instructive—just the kind of magazine to win the heart of any live, active, clean-minded boy of 8 to 18 years.

THE AMERICAN BOY

A Christmas Gift that Lasts All Year

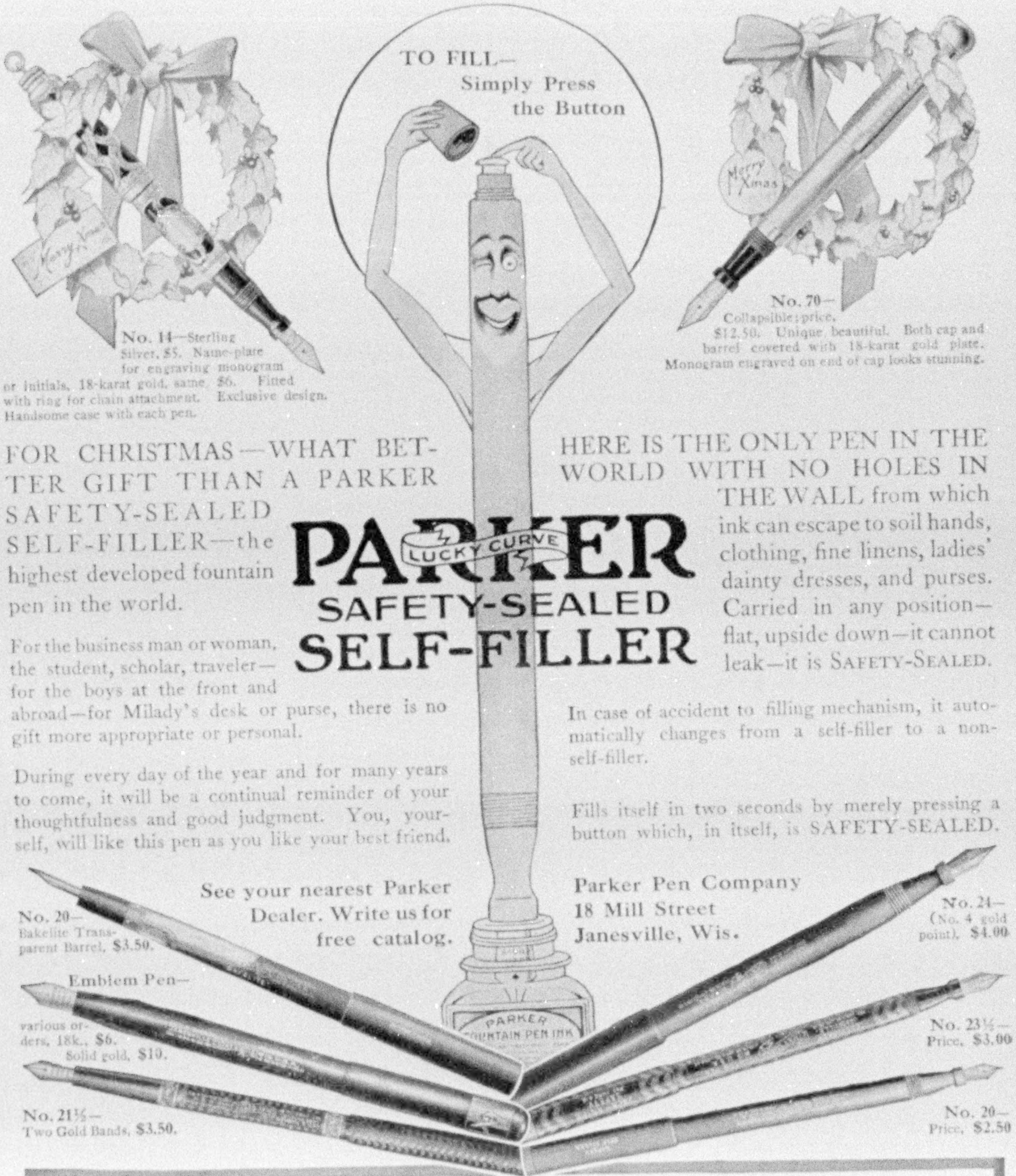
Fascinating fiction by world's leading writers for boys—inspiring—not trashy or sensational. Pages for the outdoors boy by Dan Beard; regular departments of athletics; how to get strong, how to make money, how to do and how to make things; electricity, inventions, photography. Covers history, science, famous men—everything a boy likes.

$1.50 a year. 15c a copy at news-stands.

THE SPRAGUE PUBLISHING COMPANY
28 American Building Detroit, Mich.

The American Boy

SANTA CLAUS SUGGESTS
PARKER SAFETY-SEALED FOUNTAIN PENS



TO FILL—
Simply Press
the Button

No. 14—Sterling Silver, $5. Name-plate for engraving monogram or initials, 18-karat gold, same, $6. Fitted with ring for chain attachment. Exclusive design. Handsome case with each pen.

No. 70—Collapsible; price, $12.50. Unique, beautiful. Both cap and barrel covered with 18-karat gold plate. Monogram engraved on end of cap looks stunning.

FOR CHRISTMAS—WHAT BETTER GIFT THAN A PARKER SAFETY-SEALED SELF-FILLER—the highest developed fountain pen in the world.

PARKER
SAFETY-SEALED
SELF-FILLER

For the business man or woman, the student, scholar, traveler—for the boys at the front and abroad—for Milady's desk or purse, there is no gift more appropriate or personal.

During every day of the year and for many years to come, it will be a continual reminder of your thoughtfulness and good judgment. You, yourself, will like this pen as you like your best friend.

HERE IS THE ONLY PEN IN THE WORLD WITH NO HOLES IN THE WALL from which ink can escape to soil hands, clothing, fine linens, ladies' dainty dresses, and purses. Carried in any position—flat, upside down—it cannot leak—it is SAFETY-SEALED.

In case of accident to filling mechanism, it automatically changes from a self-filler to a non-self-filler.

Fills itself in two seconds by merely pressing a button which, in itself, is SAFETY-SEALED.

See your nearest Parker Dealer. Write us for free catalog.

Parker Pen Company
18 Mill Street
Janesville, Wis.

No. 20—Bakelite Transparent Barrel, **$3.50.**

Emblem Pen—various orders, 18k., **$6.** Solid gold, **$10.**

No. 21½—Two Gold Bands, **$3.50.**

No. 24—(No. 4 gold point), **$4.00**

No. 23½—Price, **$3.00**

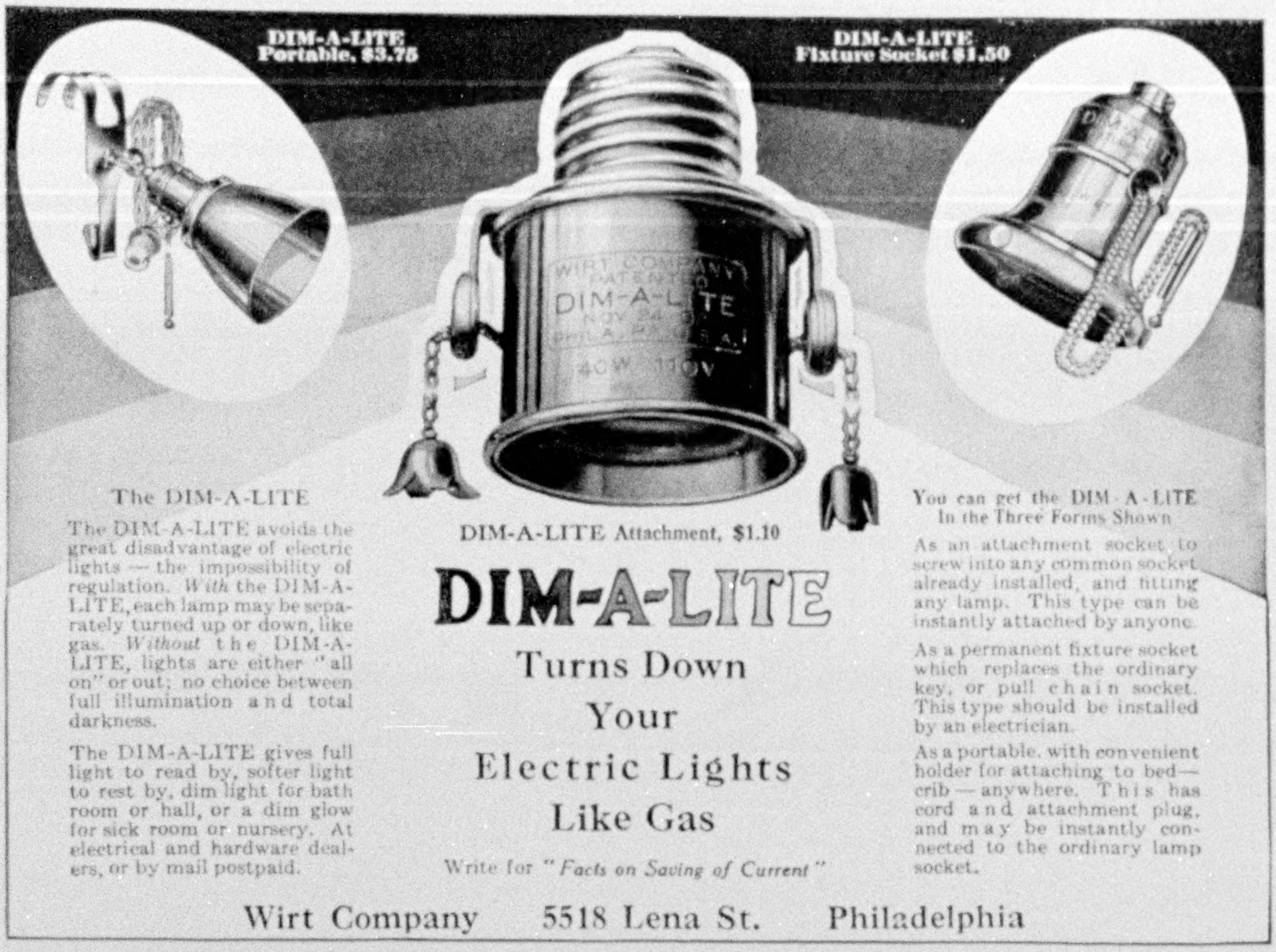
No. 20—Price, **$2.50**

MONOGRAMS ENGRAVED IN COLORS

Initials or monograms on the fountain, either mounted or plain barrel, add much to the distinctiveness of the gift. Almost any jeweler in your city can do this.

IN ATTRACTIVE GIFT BOXES—Radiating the Holiday Spirit

Parker Dealers are making a special holiday display of the latest Parker Fountain Pens in dainty Christmas boxes. All sizes and models, $2.50, $3.00, $4.00, and $5.00. Write us for free catalog.


WIRT COMPANY
PATENTED
DIM-A-LITE
NOV 24-
PHILA. PA. U.S.A.
40W 110V

DIM-A-LITE
Portable, $3.75

DIM-A-LITE
Fixture Socket $1.50

The DIM-A-LITE

The DIM-A-LITE avoids the great disadvantage of electric lights — the impossibility of regulation. *With* the DIM-A-LITE, each lamp may be separately turned up or down, like gas. *Without* the DIM-A-LITE, lights are either "all on" or out; no choice between full illumination and total darkness.

The DIM-A-LITE gives full light to read by, softer light to rest by, dim light for bath room or hall, or a dim glow for sick room or nursery. At electrical and hardware dealers, or by mail postpaid.

DIM-A-LITE Attachment, $1.10

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Your
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Like Gas

Write for "*Facts on Saving of Current*"

You can get the DIM-A-LITE
In the Three Forms Shown

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As a portable, with convenient holder for attaching to bed—crib — anywhere. This has cord and attachment plug, and may be instantly connected to the ordinary lamp socket.

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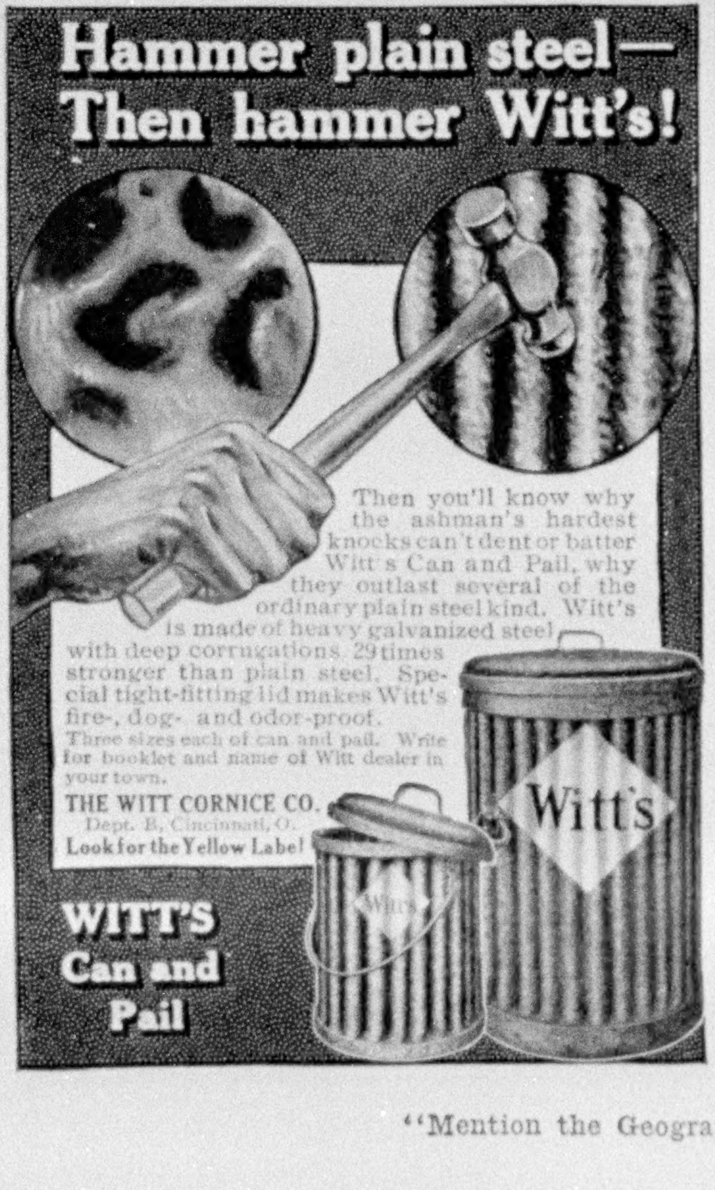
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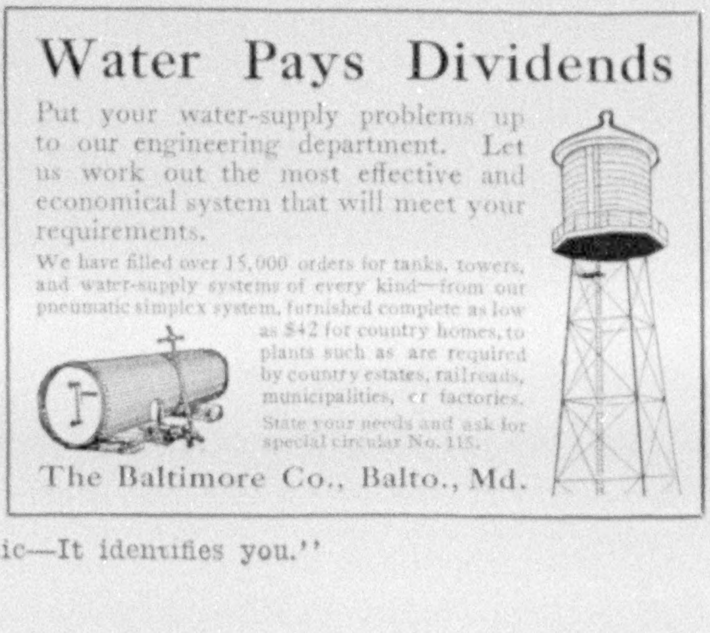

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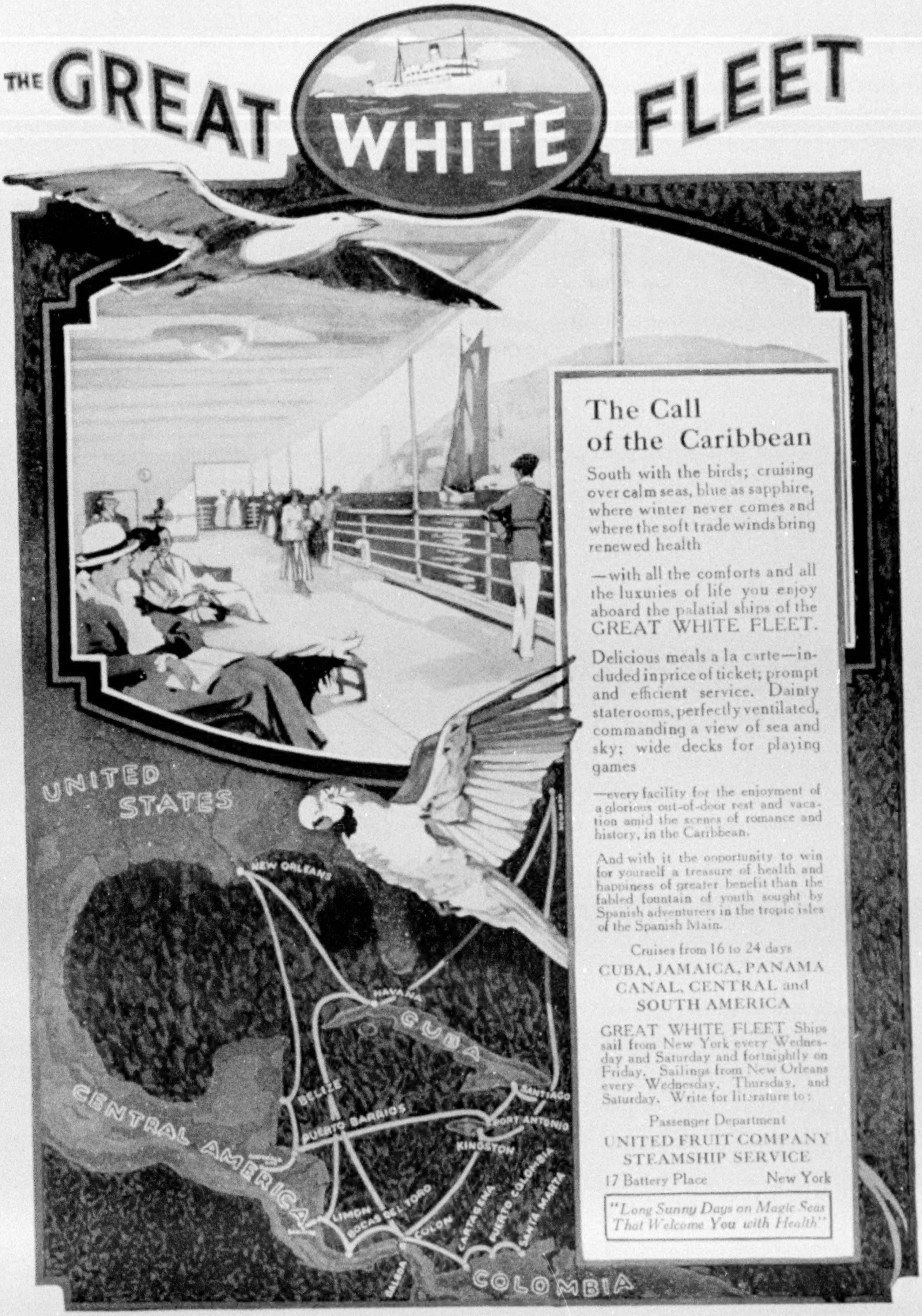
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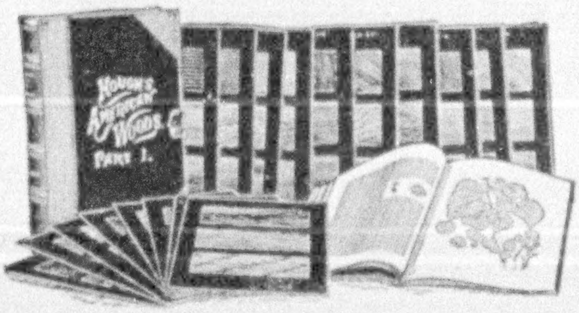
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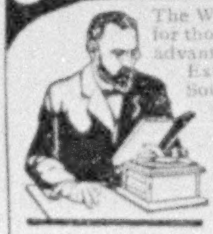

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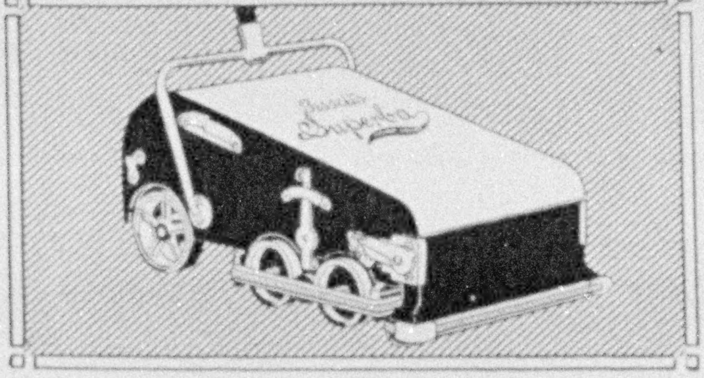

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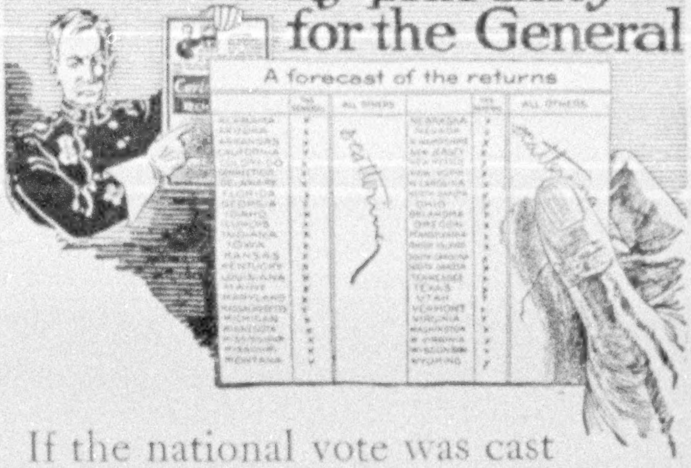
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scattering

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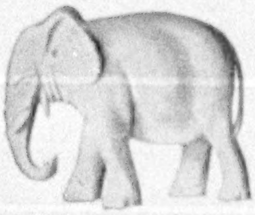

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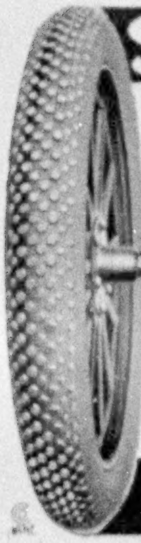

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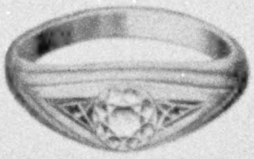

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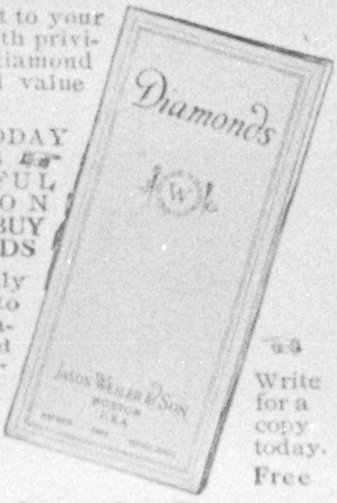

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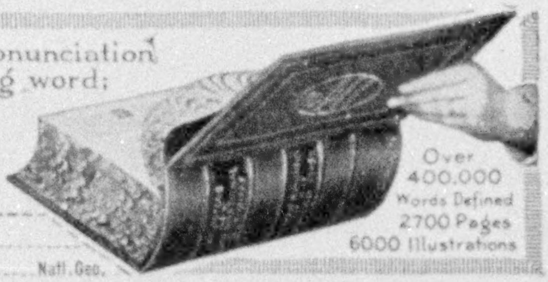

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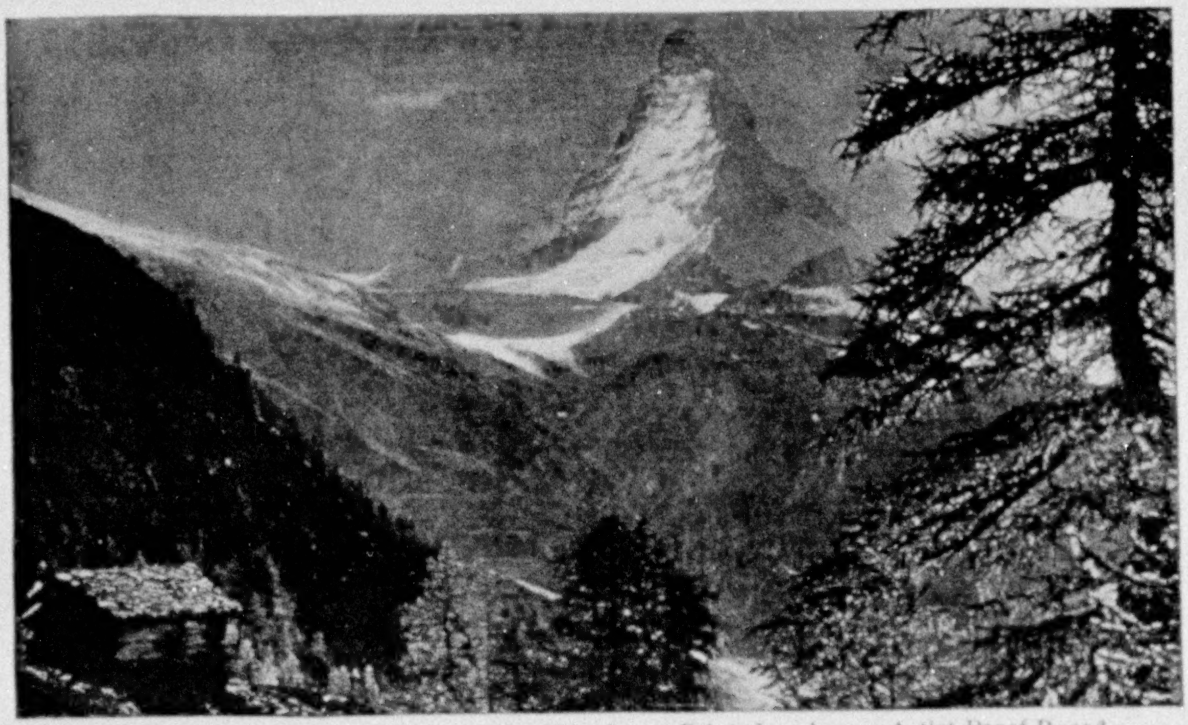

The Majesty of the Matterhorn—17 x 22 inches. Printed on heavy Artist-Proof Board

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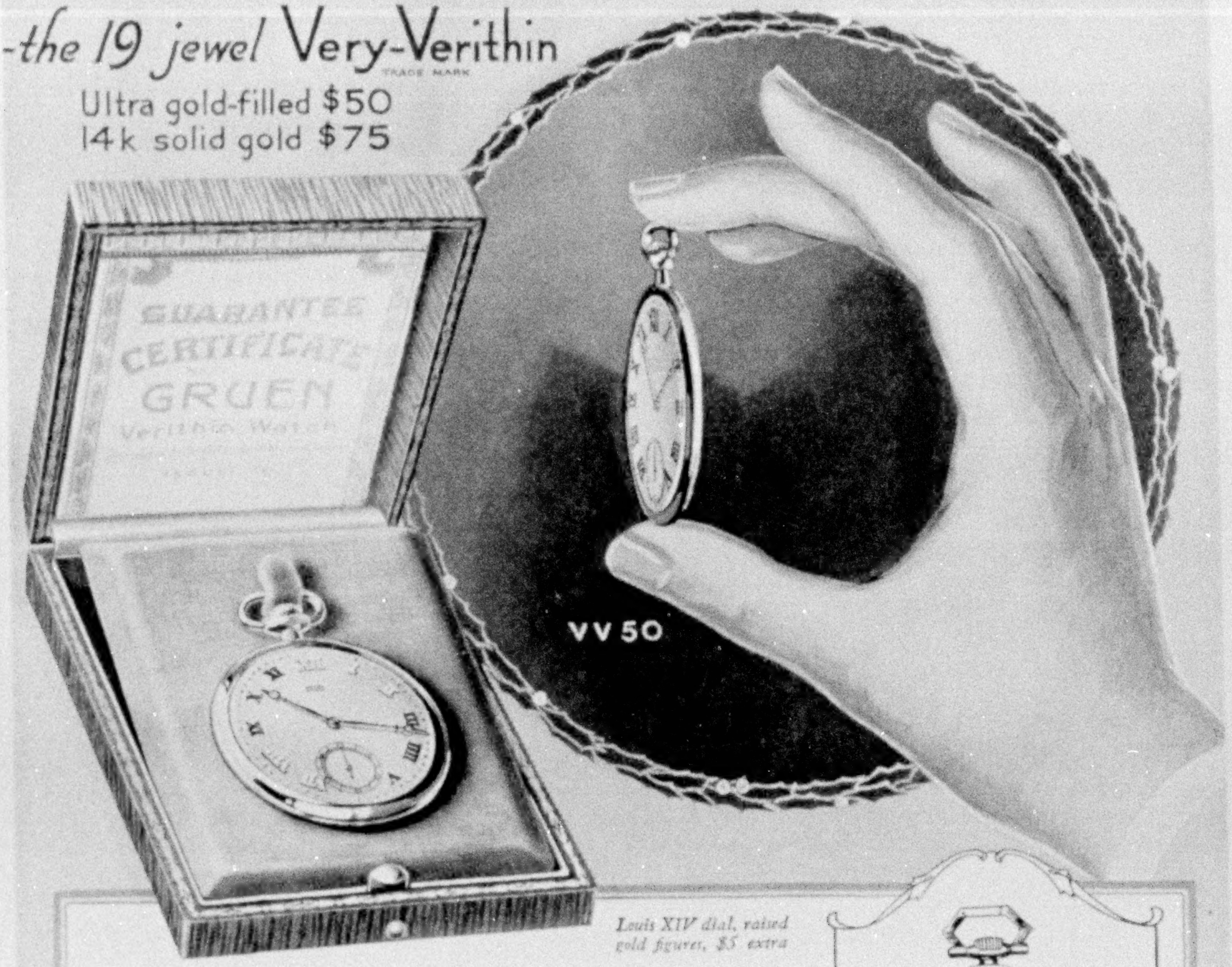

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It has 19 ruby jewels—set in raised solid gold settings. It is adjusted to six positions, to temperature and isochronism. Its movement is made of the finest hardened materials, and has every known improvement. Its very compactness insures its durability.

And—"Oh! Isn't it beautiful!"

This is the exclamation that seems to come involuntarily from everybody to whom this watch is shown. It is thinner than the famous Gruen Verithin and "fits your pocket like a silver dollar."

It has that charm which comes from perfect designing; that efficient, "precision" look which makes men call a machine "a beauty."

It has, in short, an even greater claim to that title earned by the Gruen Verithin—"*The Most Beautiful Watch in America.*"

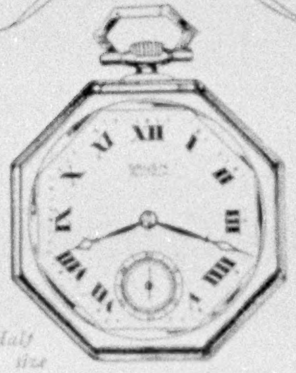
See it at the leading jewelers in your city.

Model No. VV50—Ultra gold-filled case (guaranteed to wear better than 25-yr. gold-filled). Price, $50.00.

Model No. VV75—14k solid gold case. Price, $75.00.

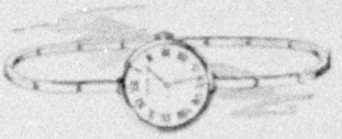
See the countersigned certificate of real value in the box, guaranteeing this watch under the "Gruen-Special-Service-System."

If your jeweler should not have this watch, write us, naming model you are interested in, and we will arrange for you to see it. THE GRUEN WATCH MANUFACTURING CO., 32 E. Fifth Ave., Cincinnati, Ohio, "*Makers of the famous Gruen Watches since 1874.*" Factories: Cincinnati, and Madre-Biel, Switzerland. Canadian Branch, Toronto, Can.



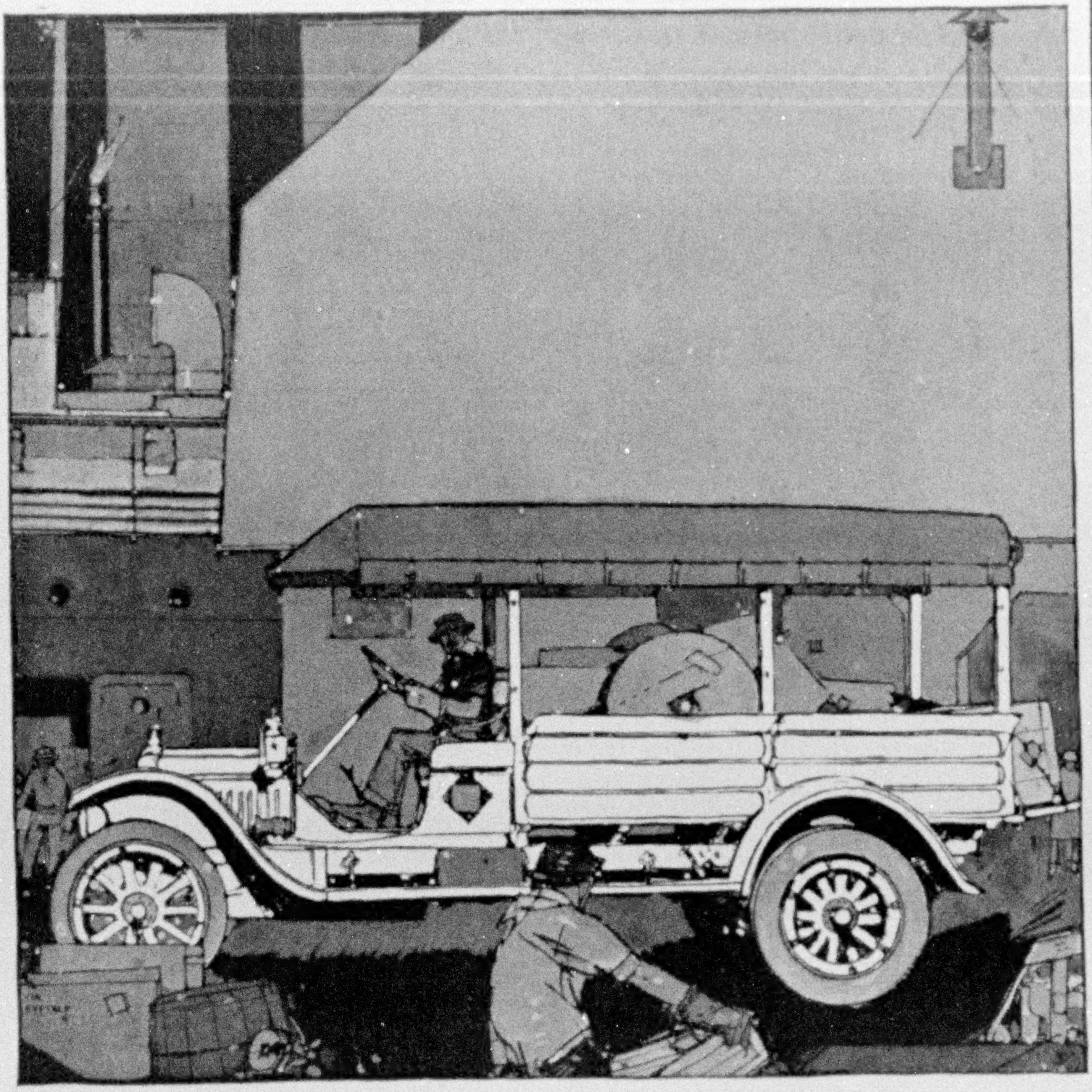
Half size

The popular new Gruen Octathin Model. Prices: $40, $45, $75, $90, $100, $125, $175. Other regular Gruen Verithin Models, $25 to $250.



No. W839. New Gruen Wristlet Model with Louis XIV platinum dial, 14k green or yellow gold bracelet of exclusive design, and finely jeweled adjusted movement, $50.

Others, $25 to $250.



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WHITE Trucks predominate in every line of business. But they are pre-eminent in road-making and in department store service—known to be the two most drastic types of motor truck service—one involving the hardest pull; the other the most constant duty.

THE WHITE COMPANY
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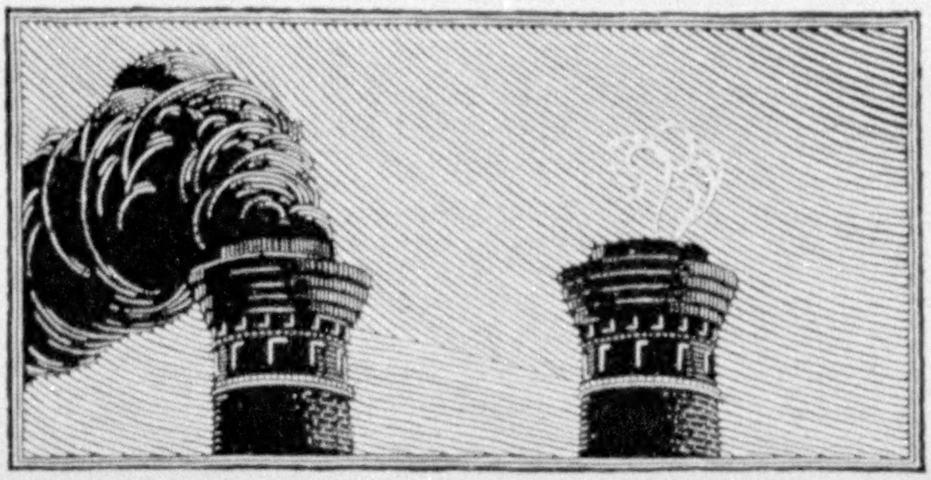

Waste! Modern *economy* demands all the power of the fuel and all the "drive" of the gasoline

Because of mechanical betterments, coal which yesterday went to the mine dumps is today driving the machinery of production and transportation—for the gases that once were wasted are now consumed.

More energy is extracted—by the help of science—from every pound of coal.

And because of Twin-six motor refinements, the Packard demonstrates its unusual ability to handle low-gravity gasoline—to transform a sluggish vapor into hot, lean, lively gas and return utmost mileage in all weathers and on all roads.

More energy is now extracted—by the Twin-six—from every gallon of gasoline.

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Packard prices are $2,865 and $3,265—at Detroit—for the 2-25 and 2-35 open cars.

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CHAINLESS
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The 3 BEST SELLERS
THE POWDER
THE STICK
THE CREAM
COLGATE'S RAPID-SHAVE POWDER
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COLGATE'S SHAVING CREAM

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"Rapid action throughout, leading to a wholly satisfactory solution of the problem involved."
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Professor Barber

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"Clean cut and smooth—no hack work here. All the stubborn characters are mollified and gracefully removed at the end."
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"Flows smoothly on to a delightful conclusion, leaving a sensation of genuine satisfaction."
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It speaks volumes for superior quality—the fact that so many men find complete satisfaction and comfort in the use of

COLGATE'S
SHAVING LATHER
STICK - POWDER - CREAM

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